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OPAL Data Graphing

SBIR Data Reporting / Graphing requirements

- Need interface to get/put information of school district, school region, school name, and class (with the option of retrieving this information directly from schools' student data files)
- Need interface to assign students to test versions and computer terminals
- Need to assign district, school region, school, class, and group ID and individual student ID numbers for storage and retrieval of data
- Display data as shown in the tables and graphs
- Display district, region, school, teacher, class, grade level on charts (see sample)
- Display name of test, CCI logo, copyright, disclaimer
- Use different colors for pre-test and post-test bars on graphs (maximum display of two (2) most recent test administrations)
- Need interface to assign ID number for storage and retrieval of data
- Display date of pre- and post- test, chronological age (date of test taken – date of birth), and grade of the student for individual student reports. Pre-test and post-test dates need to be labeled (see samples).

SBIR Data Reports

- There are three data report formats for class teachers to access and two more data report forms for school level and above. For individual parents, only individual student data summary is provided.
  - ✓ Class Data Graphs (see the report samples on pages 4-7).
  - ✓ Class Comparison with Multi-State Sample Average Tables (see the report samples on page 9).
  - ✓ Individual Student Data Summary (see the report samples on pages 10-12: This report is a two-section table to show students' performance at their grade level and Full version level).
  - ✓ District/Region/School/Class Data Graphs & Tables (see the report samples on pages 14-16). Click "region" at district level to link to the school level graphs and click "school" at region level will link to the class level graphs. Click pre-test/post-test bar will link to pre-test/post-test database tables. The database will have the function of retrieving all the (school/class) students' data with search and sort capabilities (e.g., search grade level = 1 and Blending Phonemes > = 3; sort total score in descending order, etc.) The default fields for the table will be student name, 8 subtest total scores, total score for the test, and total time spent; 11 fields for pre-test and post-test respectively. (*link interface design needs to be discussed with Noah*)
  - ✓ Comparison of Regions/Schools/Classes to Multi-State Sample Average (see the report samples on pages 19-20)
- Landscape will be the default print layout for all graphs. Portrait will be the default print layout for all tables. There should be an option of Landscape or Portrait for printing.
- Teachers should be able to access a "first level button menu" from where they can click on the buttons to access the data they are interested and print the reports they need. The button's name reflects what information teachers can expect to get from this report. When the pointer moves inside the button area, a floating window showing the detail information about the reports in this branch (e.g., Answer your questions: What is the profile of relative strengths & weakness for my class … – *see document Hyperlink Descriptions)*. Reports are linked together. They can also be accessed by clicking on the buttons (hyperlinks) on another report.
- There will be six buttons on the "first level button menu" screen. They are

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- Average Score on All Test Sections (Graph)
- Total Score Comparison (Graph)
- Class Comparison with Multi-State Sample Average (Table)
- Individual Student Data Summary (Table)
- District/Region/School/Class Data Graphs & Tables
- Comparison of Regions/Schools/Classes to Multi-State Sample Averages (Table)

➢ For individual packages (packages for parents), only Individual Student Data Summary report is needed.

➢ Class teachers can only access their students' data, so when they access the "first level button menu", buttons for the school and above levels are inactive.

➢ There will be a Back button and a Menu button on all the graphs and tables. Clicking on Back button to bring the user to the previous screen (where it comes from) and on Menu button to bring the user to the first level button menu for another option.

➢ There will be a Print button on each data report screen, where teachers can click to print the report(s). When they click the Print button, a window pops up and provides the choices of "Print All", "Print Current Student/Subtest", and "Print ..."

- Print All: print all the reports of the form on the screen that the teacher is seeing. For example, if there are a total of 35 reports (students), they will all be printed at one time.
- Print Current Student/Subtest: print the current report of the form on the screen that the teacher is seeing. For example, if there are a total of 35 students' records but on the screen that is Jim's report, only Jim's is printed out.
- Print ...: there should be a pull-down menu with all the registered students' names for student reports or subtest names for subtest reports listed. Teacher can click to choose those he/she needs to print out. For example, the teacher can choose to print Jim, Lynn, and Susan's reports from 35 students.

➢ Names on the *X* axis will be first initial + last name or full name (will be based on how many characters are acceptable for the database)

➢ Text on the *X* and *Y* axes can change directions

➢ For District/Region/School/Class data, the access permission will be as follows:

Level	Access Permission	Grade level for comparison		
		Kindergarteners	First Graders	Second Graders
District access	Districts	✓	✓	✓
	Regions	✓	✓	✓
	Schools	✓	✓	✓
Region access	Regions	✓	✓	✓
	Schools	✓	✓	✓
School access	Schools	✓	✓	✓

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Formulas:

Mean (Average): $\bar{x} = \frac{1}{n}\sum x_i$ where n = observations (subject number)

Standard Deviation: $SD = \sqrt{\frac{1}{n-1}\sum (x_i - \bar{x})^2}$

Notes for Graphs and Tables:

- Limited by space, the components of graphs are not proportionally sized. The layout of the graphs on screens should be designed such that 1) font for title should be bigger; 2) title should be placed in the center across top; 3) use right shapes / graphics for buttons, for example, right arrow for Go Next; 4) allow enough space between components on the screen; 5) everything on the screen should visually please eyes and be readable; and 6) use color but no more than 4 colors on each screen.)
- For those graphs that cannot show all the data at a time (e.g., sample graphs 2 and 3 for class data), there will be next and previous arrow buttons, and zoom-in and zoom-out buttons. Default for these graphs will be the first 10 records. Click the "next" arrow button to show the next 10 records and "previous" arrow button to show the previous 10 records. Click on the "zoom-out" button to see all the data, and "zoom-in" button to go back to default graph.
- For those graphs showing subtests on the x axis, the test item numbers should be variables. They will change based on different versions (e.g., in the sample graph, there are 12 test items for Rhyming, the number 12 should change to 15 if there are 15 test items).
- For all the bar graphs, there is a Data Values On/Off toggle button to provide the option of having or not having values on the graphs.
- On some graphs and tables, there will be a cycle-through button (see samples). They can be clicked to cycle through the eight subtests, 6 grade level versions*, or the 35 students. **(It will be replaced with a pull down / up menu for the user to select the items they'd like to have)**
- There should be somewhere on the screen to let the user know how to use the cycle-through buttons (or pull down/up menu) to see different graphs or tables, and toggle buttons to access different mode.
- There will be a button on all the graph and table screens with the options of having a report displaying 1) all the test results, 2) Pre-test and the most recent post-test, and 3) the two most recent tests. (Definition: the first test is pre-test; the other tests are post-test (1…n))
- Display corresponding test dates for individual student's test result reports.

* Kindergarten, First Grade, Second Grade, GradeK_Full (full test), Grade1_Full, and Grade2_Full.

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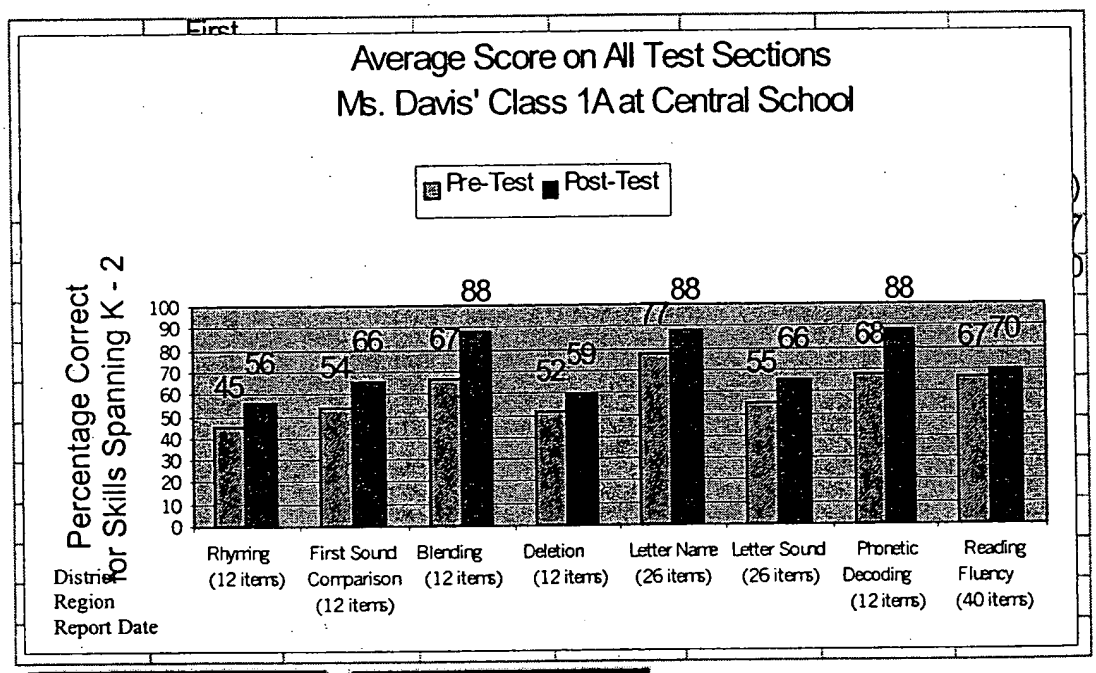
Class Data Graphs

1. Average score on all test sections (click on the subtest name (e.g., Rhyming) to view more detailed results for that subtest (graph 3))

   For whatever version of the test (KA, KB, 1A, 1B, 2A, 2B, FA, FB), the graph layout will be designed the same way; all the subtests will be displayed. However, only those available subtests will be highlighted (active); all the unavailable subtests will be inactive (gray out).

Back Menu



Data Values On/Off Display Options

* This is an example of having data values on. All the other graphs are examples having data values off.

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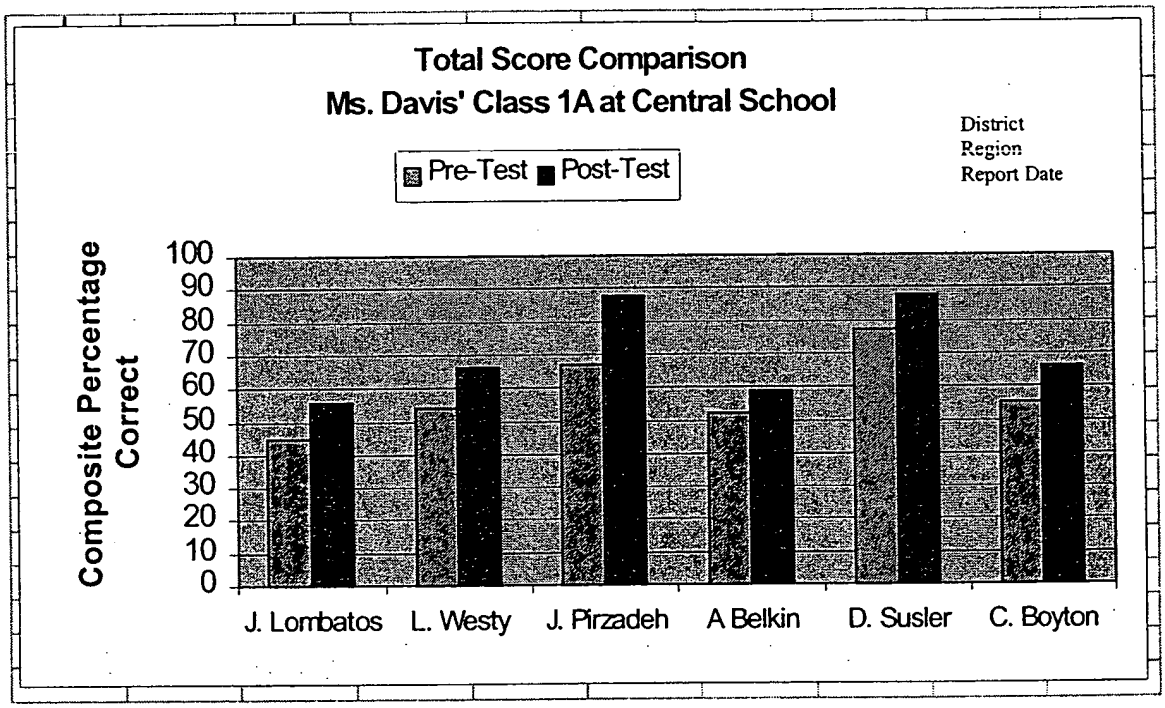
2. Total score comparison (Student names will display evenly across the *X* axis; Click on the student's name (e.g., J. Lambatos) to view individual student performance on all subtests (graph 4))

Back | Menu | Zoom In | Zoom Out



Data Values On/Off | Display Options

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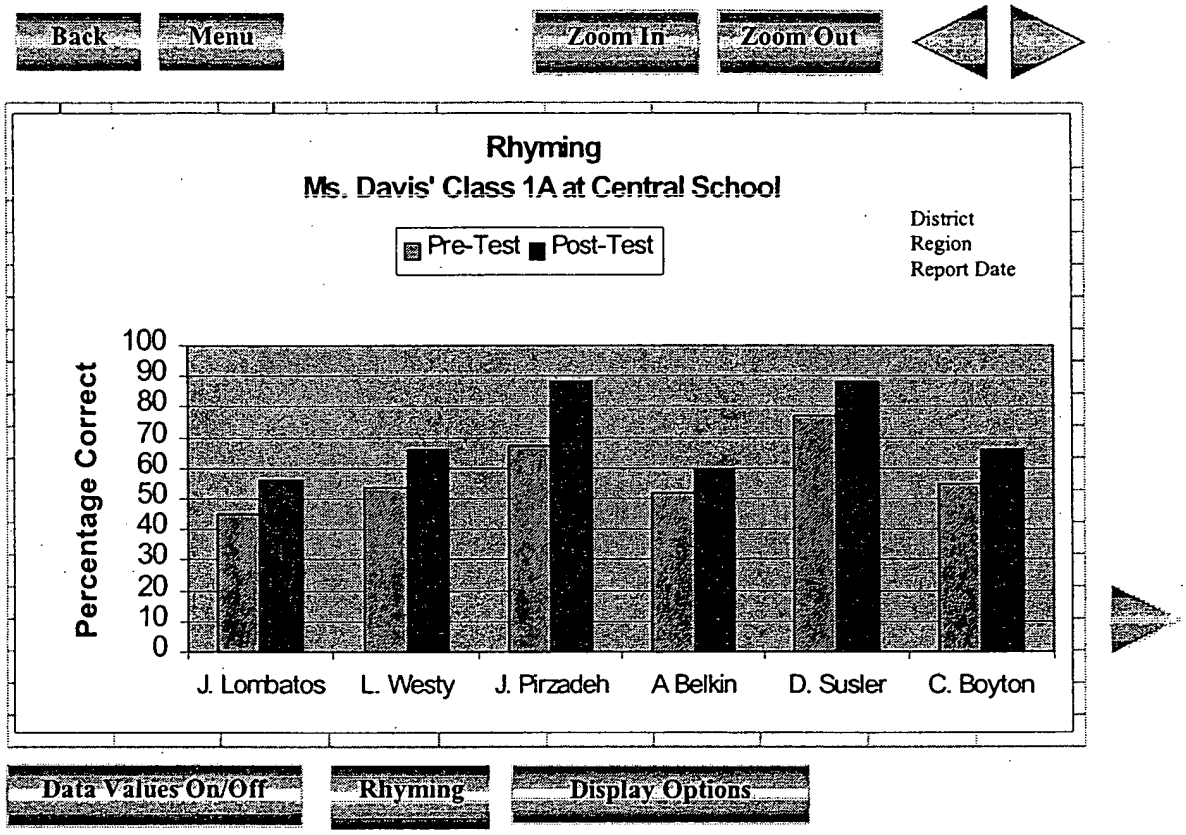
3. Students' performance on 1 sub-test (Student names will display evenly across the *X* axis; click on the student name to view the individual student's performance for all the subtests (graph 4); click on the ▶ button to see the corresponding Table: Comparison with Multi-State Sample Average.



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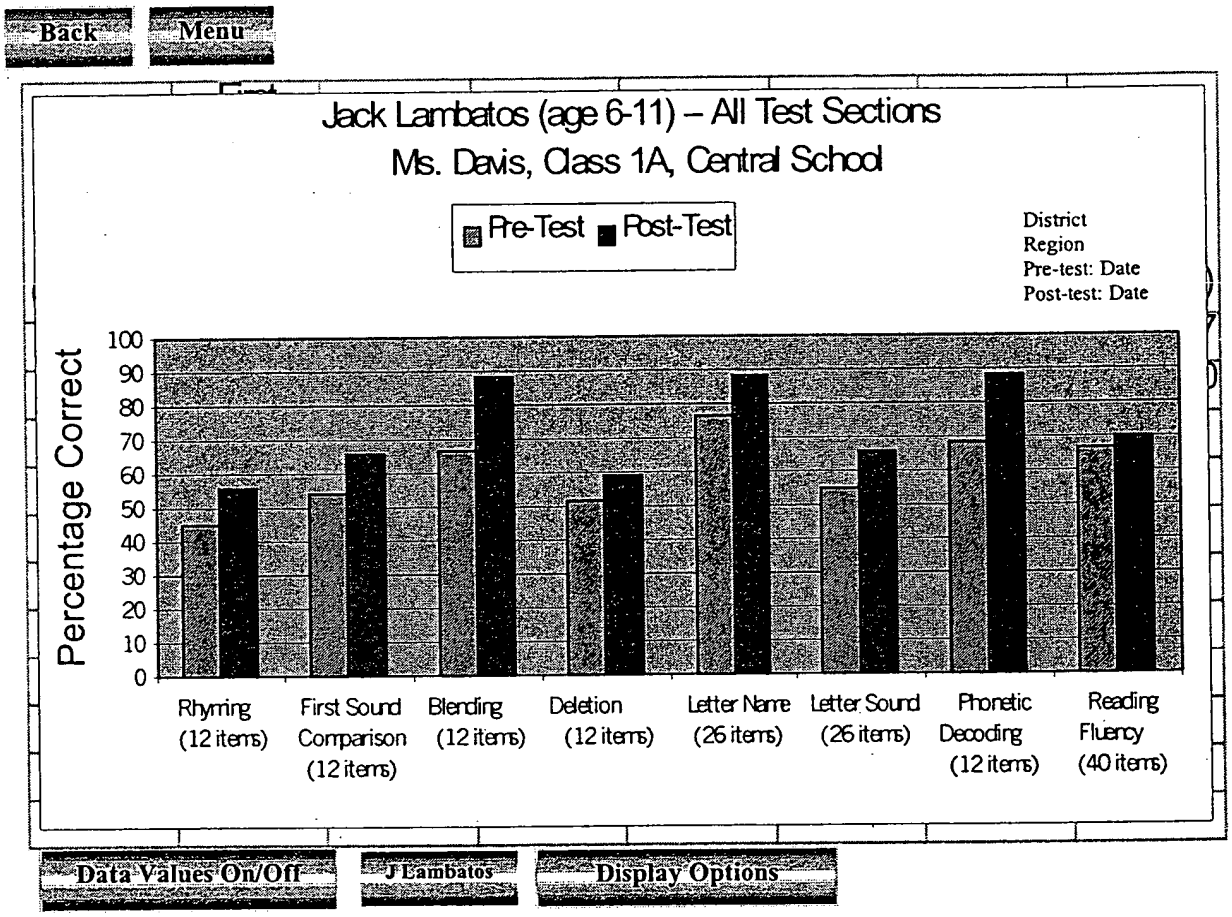
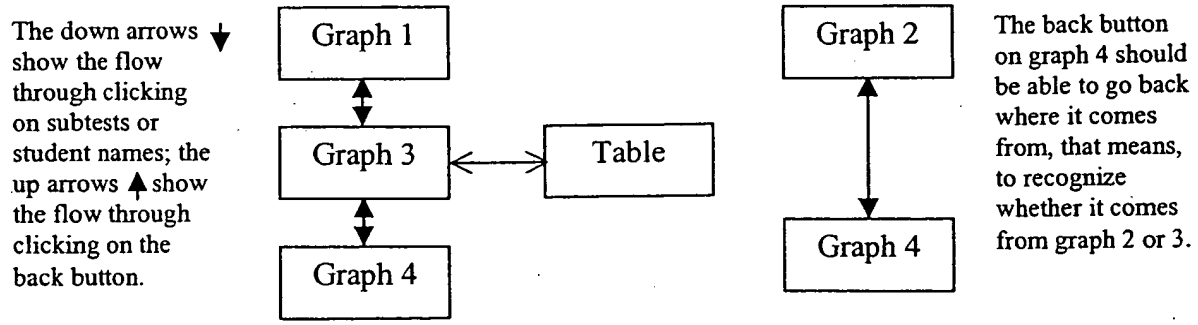
4. Individual student performance on all subtests



The above are sample Data Graph reports. Sub-test (e.g., Rhyming), and student name (e.g., J. Lambatos) are clickable. When they are clicked, another graph will display on the screen. The following flowchart and table show the hyperlink behavior and the number of graphs for each level:

Hyperlink behavior



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Number of graphs on each level (Here number indicates the number of graphs for each individual single test version package)

Graph (level)	Number	Name
Graph 1 (level 1)	1	Average Score on All Test Sections
Graph 2 (level 1)	1	Total Score Comparison
Graph 3 (level 2)	8	Rhyming
		First Sound Comparison
		Blending
		Deletion
		Letter Names
		Letter Sounds
		Phonemic Decoding Accuracy
		Reading Fluency
Graph 4 (level 2/3)	35 (Max)	Performance of *Student name* (age year – month) on All Test Sections

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Class Comparison with Multi-State Sample Average Table

There will be a button at the first level named Class Comparison with Multi-State Sample Average. Clicking on this button will access an eight-button screen. Clicking on these buttons to access individual tables. The eight-button screen will include the following:

Menu

Rhyming	Letter Names
First Sound Comparison	Letter Sounds
Blending	Phonemic Decoding Accuracy
Deletion	Reading Fluency

Clicking on one of the buttons (e.g., Rhyming) to access the following table (Comparison with Multi-State Sample Average). The pre-test scores are sorted in descending order with the sample average and the header of Pre-Test highlighted as default. The Multi-State Sample Average row is always highlighted. To see post-test scores in descending order compared with sample average, click on the header Post-Test. Then the header of Post-Test is highlighted.

Rhyming

Comparison with Multi-State Sample Average

Ms. Davis' Class 1A at Central School

District
Region
Report Date

	Student	Pre-Test	Post-Test
1	Jack. Lambatos	15	14
2	Leighton Pirzdeh	15	15
3	Joe Susler	14	15
4	Anna Boyston	13	13
5	David Westy	11	14
	Multi-State Sample Average[1]	10	
6	Christy Belkin	8	11
...	...	...	

Menu Back Rhyming Display Options

- To see post-test scores in descending order compared with sample average, click on the header Post-Test.
- Click on each student's name to access Individual Student's Data Summary.

[1] Based on performance of n = 600 from CA, IL, FL.

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OPAL Data Graphing

Individual Student Data Summary

This report can also be accessed through the "Individual Student Data Summary" button on the "first level button menu" screen. This report includes two test levels (grade level and full test) for each individual student. Items correct of the test taken, including test number and percentage, are shown in the table.

Test Report for Melissa (Kindergarten, Age 5-3)

District
Region
School
Report Date

Test Sections	Number of Test Items	Items Correct				Test Sample Average Scores[1]
		Pre-Test Date		Post-Test Date		
Kindergarten version		No.	%	No.	%	Sample size =
Rhyming	12	12	100%			Average =
First Sound Comparison	12	9	75%			
Blending	12	6	50%			
Deletion	12	9	75%			
Letter Names	26	20	77%			
Letter Sounds	26	20	77%			
Full version		Date		Date		Sample size F = Sample size KF = Sample size 1F = Sample size 2F =[2]
		No.	%	No.	%	
Rhyming	12					Average F = Average KF = Average 1F = Average 2F =[3]
First Sound Comparison	12					
Blending	12					
Deletion	12					
Letter Names	26					
Letter Sounds	26					
Phonemic Decoding Accuracy	12					
Reading Fluency	40					

Menu | Back | Melissa | Display Options

[1] Based on preliminary data gathered from sample (n = 450) in TN, OH, FL, and IL.
[2] Sample size F = (sample size of all those who took Full version); Sample size KF = (sample size of all K graders who took Full version); Sample size 1F = (sample size of all first graders who took Full version); Sample size 2F = (sample size of all second graders who took Full version); For a student report, only Sample size F and the sample size for that student's grade (e.g., for kindergarten student report, show Sample size F and Sample size KF) need to be shown in the report.
[3] Average F = (Average score of all those who took Full version); Average KF = (Average score of all those K graders who took Full version); Average 1F = (Average score of all those first graders who took Full version); Average 2F = (Average score of all those second graders who took Full version); For a student report, only Average F and the average for that student's grade (e.g., for kindergarten student report, show Average F and Average KF) need to be shown in the report.

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OPAL Data Graphing

Test Report for Juanita (First Grade, Age 6-10)

District
Region
School
Report Date

Test Sections	Number of Test Items	Items Correct				Test Sample Average Scores[1]
		Pre-Test Date		Post-Test Date		
First grade version		No.	%	No.	%	n_1 = (sample size)
Blending	12	10	80%			$\bar{x}_1$ =
Deletion	12	12	100%			
Phonemic Decoding Accuracy	12	9	75%			
Reading Fluency	40	30	75%			
Full version		Date		Date		n_F, n_{KF}, n_{1F}, n_{2F}[2]
		No.	%	No.	%	
Rhyming	12					$\bar{x}_F$ =
First Sound Comparison	12					$\bar{x}_{KF}$ =
Blending	12					$\bar{x}_{1F}$ =
Deletion	12					$\bar{x}_{2F}$ =
Letter Names	26					
Letter Sounds	26					
Phonemic Decoding Accuracy	12					
Reading Fluency	40					

Menu | Back | Juanita | Display Options

[1] Based on preliminary data gathered from sample (n = 600) in CA, FL, and IL.

[2] n_F = (sample size of all those who took Full version); n_{KF} = (sample size of all K graders who took Full version); n_{1F} = (sample size of all first graders who took Full version); n_{2F} = (sample size of all second graders who took Full version)

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OPAL Data Graphing

Test Report for Tyron (Second Grade, Age 7-9)

District
Region
School
Report Date

Test Sections	Number of Test Items	Items Correct				Test Sample Average Scores[1]
		Pre-Test Date		Post-Test Date		
Second grade version		No.	%	No.	%	n_2 = (sample size)
Deletion	12	9	75%			$\bar{x}_2$ =
Phonemic Decoding Accuracy	12	6	50%			
Reading Fluency	40	32	80%			
Full version		Date		Date		n_F, n_{KF}, n_{1F}, n_{2F}[2]
		No.	%	No.	%	
Rhyming	12					$\bar{x}_F$ =
First Sound Comparison	12					$\bar{x}_{KF}$ =
Blending	12					$\bar{x}_{1F}$ =
Deletion	12					$\bar{x}_{2F}$ =
Letter Names	26					
Letter Sounds	26					
Phonemic Decoding Accuracy	12					
Reading Fluency	40					

Menu | Back | Tyron | Display Options

[1] Based on preliminary data gathered from sample (n = 600) in CA, FL, and IL.

[2] n_F = (sample size of all those who took Full version); n_{KF} = (sample size of all K graders who took Full version); n_{1F} = (sample size of all first graders who took Full version); n_{2F} = (sample size of all second graders who took Full version)

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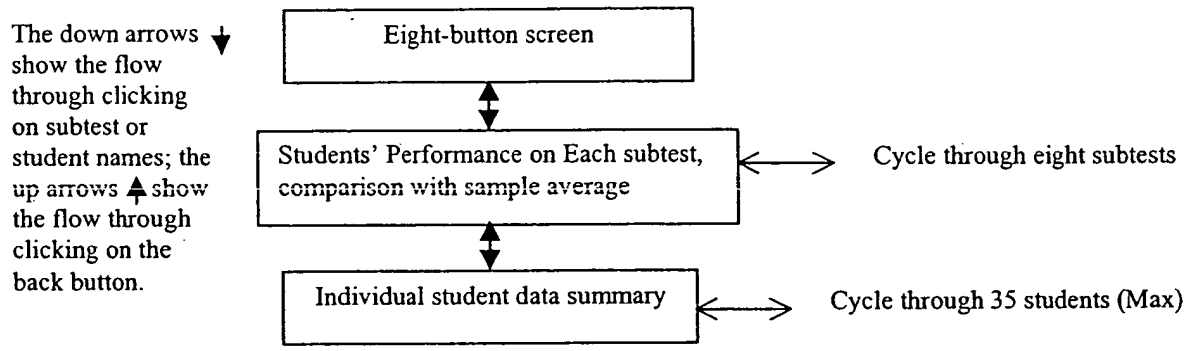
The above are sample Data Tables and Summary reports. Clicking on students' names and the cycle-through buttons will move to another report. The following flowchart and table show the hyperlink behavior and the number of reports for each level:

Hyperlink behavior



Number of reports on each level (Here number indicates the number of graphs for each individual single test version package)

Graph (level)	Number	Name
Eight button level	1	N/A
Report level 1	8	Rhyming: Comparison with Multi-State Sample Average
		First Sound Comparison: Comparison with Multi-State Sample Average
		Blending: Comparison with Multi-State Sample Average
		Deletion: Comparison with Multi-State Sample Average
		Letter Names: Comparison with Multi-State Sample Average
		Letter Sounds: Comparison with Multi-State Sample Average
		Phonemic Decoding Accuracy: Comparison with Multi-State Sample Average
		Reading Fluency: Comparison with Multi-State Sample Average
Report level 2	35 (Max)	Test Report *for Student name* (*age year-month*)

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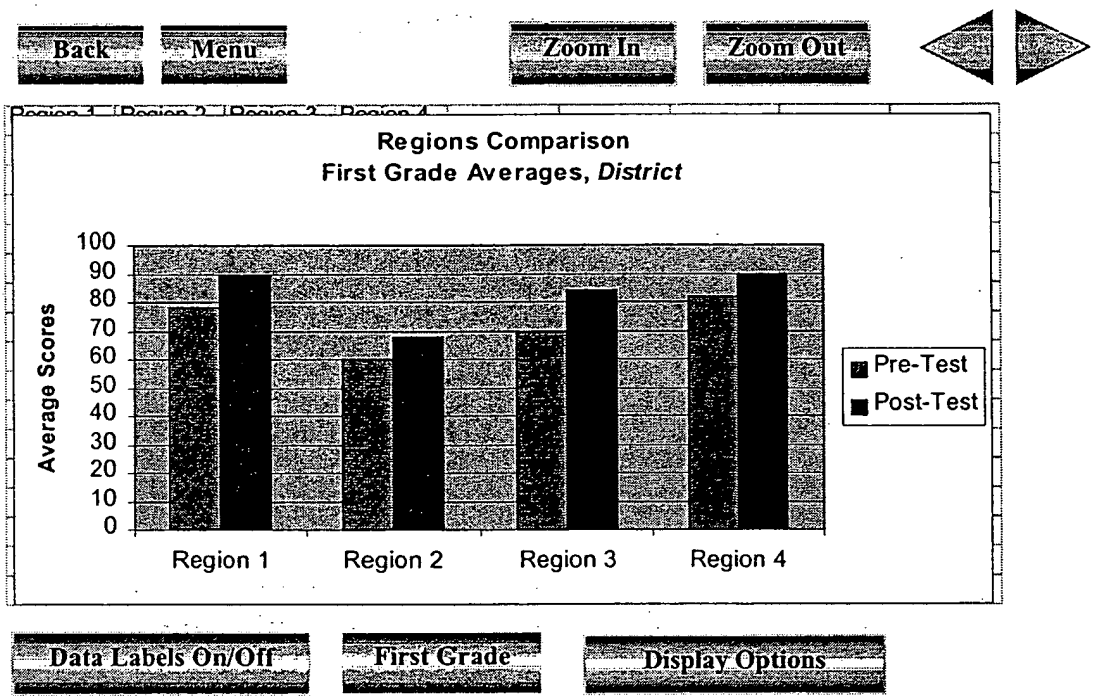
District/Region/School/Class Data Graphs & Tables

When the "Comparison of Regions/Schools/Classes to Multi-State Sample Average" button on the "first level button menu" screen is clicked, districts can directly access the following graph 1; regions can directly access the following graph 2; and schools can directly access the following graph 3. Lower level graphs can also be accessed through higher level graphs.

1. For School Districts (click the region name to access the graphs for all the schools' data; click the bars to access database tables for pre-test/post-test scores, where teachers can use sort and search functions to sort/search region information needed)



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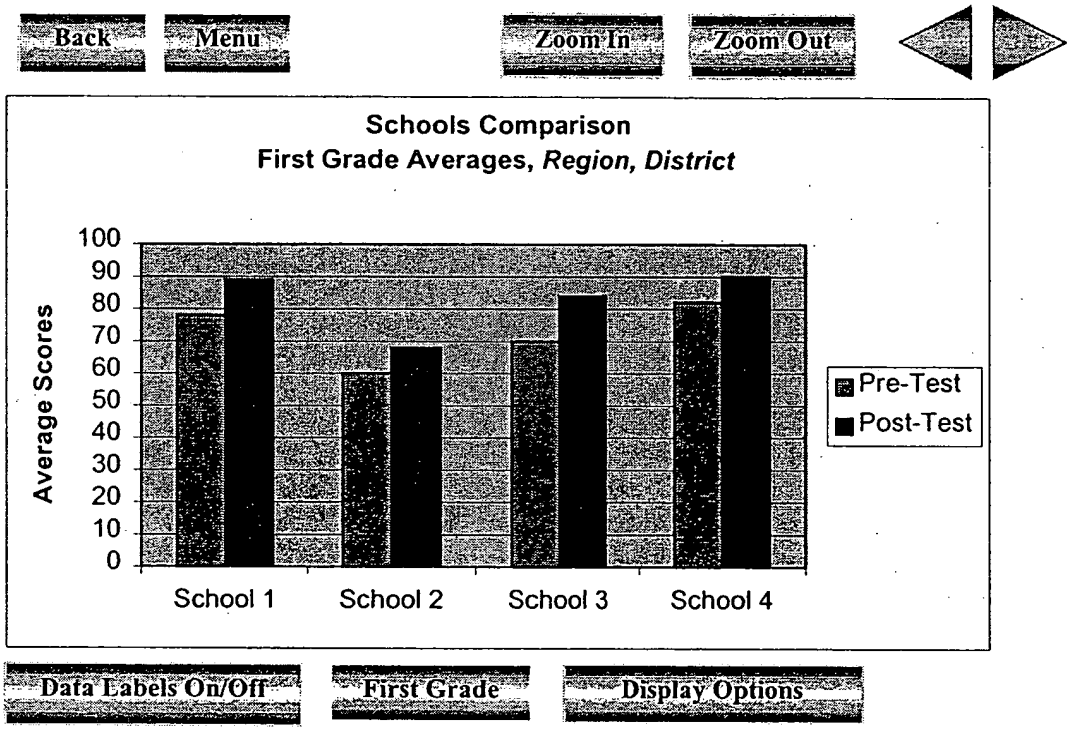
2. For Regions (click the school name to access the graphs for all the school classes' data – three separate graphs of for Kindergarteners, for First Graders, and for Second Graders; click the bars to access database tables for pre-test/post-test scores, where teachers can use sort and search functions to sort/search school information needed)



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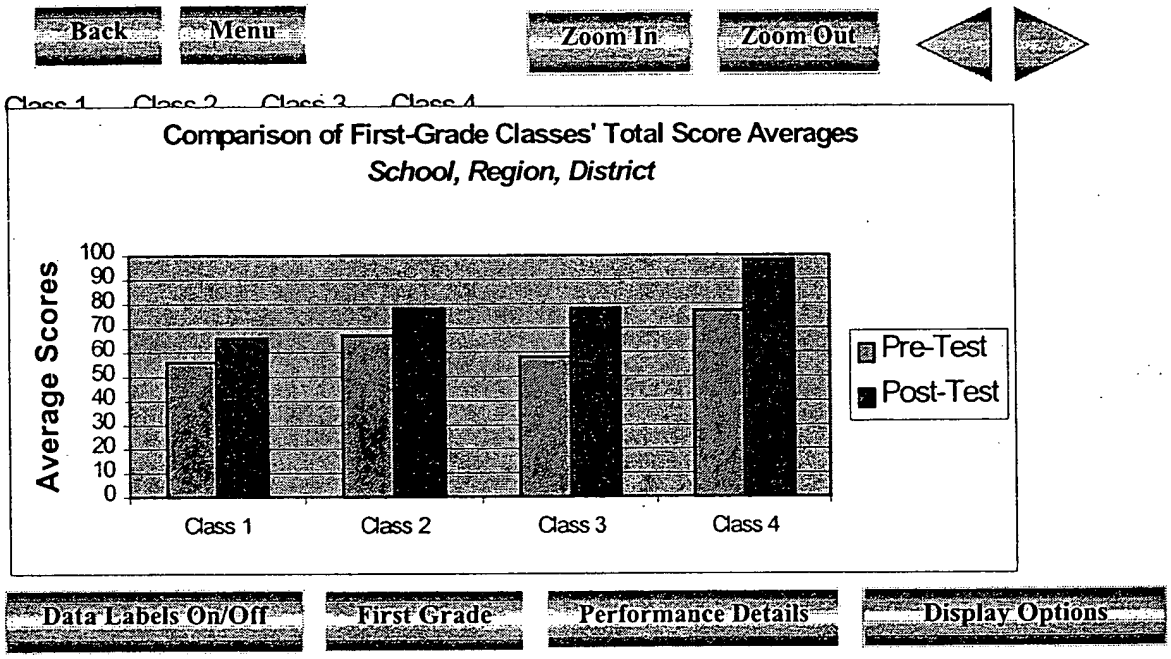
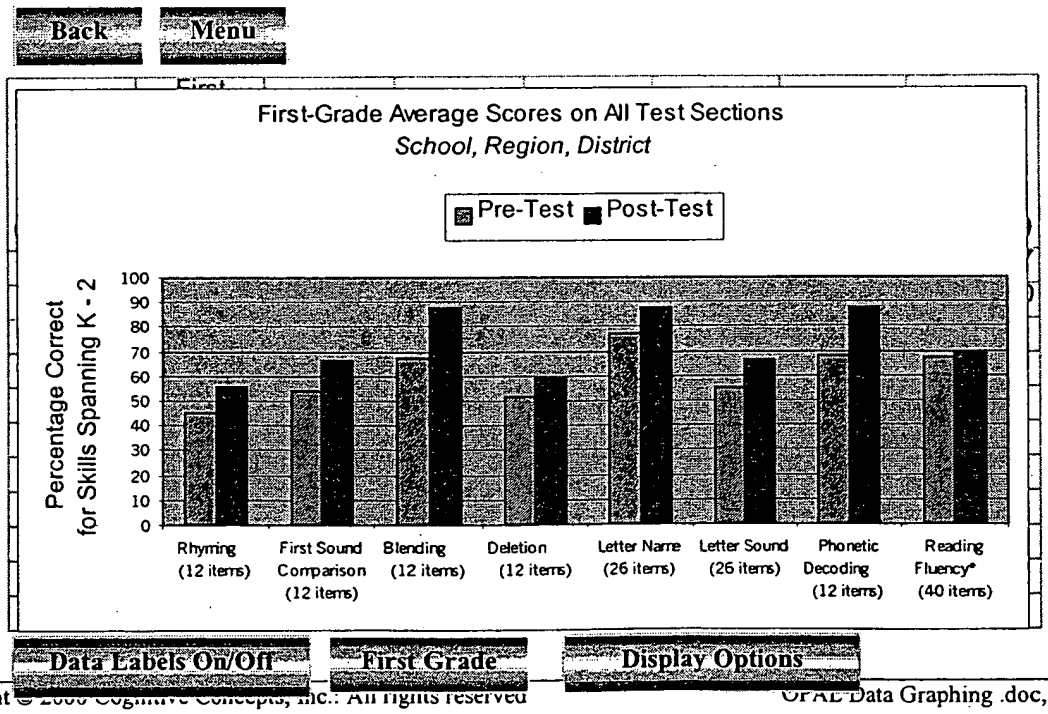
3. For Schools (click the Performance Details button to access For School Performance Details graph; click the bars to access database tables for pre-test/post-test scores, where teachers can use sort and search functions to sort/search class information needed)



4. For School Performance Details (the test item numbers should be variables. They will change based on different versions (e.g., in the sample graph, there are 12 test items for Rhyming, the number 12 will change to 15 if there are 15 test items)).



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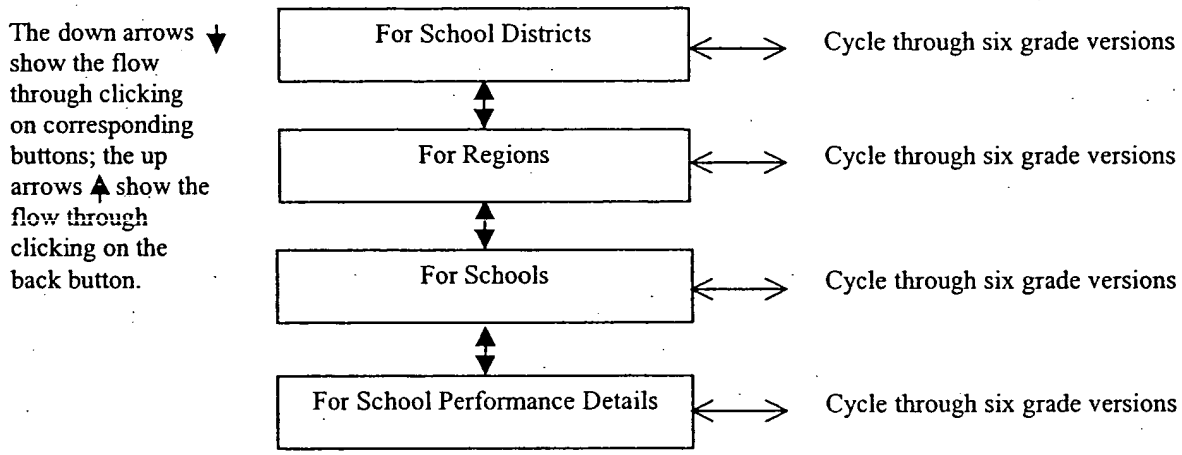
OPAL Data Graphing

The above are sample Data Graph reports at district, region, and school levels. The following flowchart and table show the hyperlink behavior and the number of reports for each level:

Hyperlink behavior



Number of reports on each level

Graph (level)	Number	Name
For school districts (level 1)	6	Regions Comparison: Kindergarten Averages, *District*
		Regions Comparison: First Grade Averages, *District*
		Regions Comparison: Second Grade Averages, *District*
		Regions Comparison: GradeK_Full Averages, *District*
		Regions Comparison: Grade1_Full Averages, *District*
		Regions Comparison: Grade2_Full Averages, *District*
For regions (level 2)	6	Schools Comparison: Kindergarten Averages, *Region, District*
		Schools Comparison: First Grade Averages, *Region, District*
		Schools Comparison: Second Grade Averages, *Region, District*
		Schools Comparison: GradeK_Full Averages, *Region, District*
		Schools Comparison: Grade1_Full Averages, *Region, District*
		Schools Comparison: Grade2_Full Averages, *Region, District*
For schools (level 3)	6	Classes Comparison: Kindergarten Averages, *School, Region, District*
		Classes Comparison: : First Grade Averages, *School, Region, District*
		Classes Comparison: Second Grade Averages, *School, Region, District*

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		Classes Comparison: GradeK_Full Averages, *School, Region, District*
		Classes Comparison: Grade1_Full Averages, *School, Region, District*
		Classes Comparison: Grade2_Full Averages, *School, Region, District*
For school performance details (Level 4)	6	Kindergarten Average Scores on All Test Sections *School, Region, District*
		First Grade Average Scores on All Test Sections *School, Region, District*
		Second Grade Average Scores on All Test Sections *School, Region, District*
		GradeK_Full Average Scores on All Test Sections *School, Region, District*
		Grade1_Full Average Scores on All Test Sections *School, Region, District*
		Grade2_Full Average Scores on All Test Sections *School, Region, District*

Comparison with multi-state sample averages across Regions/Schools/Classes

There will be a button at the first level named Comparison of Regions/Schools/Classes to Multi-State Sample Average. Clicking on this button will access a three-button screen. Clicking on these buttons to access individual tables. The three-button screen will include the following:

Comparison across Regions
Comparison across Schools
Comparison across Classes

When districts access to this screen all the buttons are active; when regions access this screen, Comparison across Regions are inactive; When schools access this screen, only Comparison across Classes button is active. Clicking on a button to access the following table accordingly. The default table will be Comparison on Rhyming. The pre-test scores are sorted in descending order with the sample mean and the header of Pre-Test highlighted as default. To see post-test scores in descending order compared with sample mean, click on the header Post-Test. Then the header of Post-Test is highlighted. Click on individual Region/school can access this region/school's Comparison with Multi-State Sample Average across Schools/Classes table.

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OPAL Data Graphing

Rhyming
Comparison of Regions to Multi-State Sample Average
Grade 1, Full, *District*

Report Date

	Region	N	Mean Percentage Correct	
			Pre-Test	Post-Test
1	Region 3	23	90%	92%
2	Region 5	26	88%	88%
3	Region 2	22	86%	90%
4	Region 1	30	86%	89%
5	Region 6	25	79%	79%
	Multi-State Sample Average[1]		78%	
6	Region 4	26	77%	79%
...	...		...	...

Menu | Back | Rhyming | Grade1 Full | Display Options

- To see post-test scores in descending order compared with sample average, click on the header Post-Test.
- Click on each region's name to access Comparison of Schools to Multi-State Sample Average.

Rhyming
Comparison of Schools to Multi-State Sample Average
Grade 1, Full, *Region, District*

Report Date

	School	N	Mean Percentage Correct	
			Pre-Test	Post-Test
1	School 3	23	90%	92%
2	School 5	26	88%	88%
3	School 2	22	86%	90%
4	School 1	30	86%	89%
5	School 6	25	79%	79%
	Multi-State Sample Average[1]		78%	
6	School 4	26	77%	79%
...	...		...	...

Menu | Back | Rhyming | Grade1 Full | Display Options

- To see post-test scores in descending order compared with sample average, click on the header Post-Test.
- Click on each school's name to access Comparison of Classes to Multi-State Sample Average.

[1] Based on performance of n = 450 from CA, IL, FL.

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OPAL Data Graphing

Rhyming

Comparison of Classes to Multi-State Sample Average

Grade 1, Full, *School, Region, District*

Report Date

	Class	N	Mean Percentage Correct	
			Pre-Test	Post-Test
1	Class 3	23	90%	92%
2	Class 5	26	88%	88%
3	Class 2	22	86%	90%
4	Class 1	30	86%	89%
5	Class 6	25	79%	79%
	Multi-State Sample Average[1]		78%	
6	Class 4	26	77%	79%
...	...		...	...

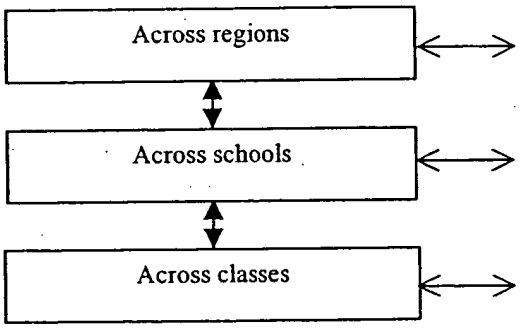
Menu | Back | Rhyming | Grade1_Full | Display Options

- To see post-test scores in descending order compared with sample average, click on the header Post-Test.

The above are sample Data Table reports at district, region, and school levels. The following flowchart and table show the hyperlink behavior and the number of reports for each level:

Hyperlink behavior

The down arrows ↓ show the flow through clicking on region/school names; the up arrows ↑ show the flow through clicking on the back button.



Cycle through eight subtests and six grade versions

Cycle through eight subtests and six grade versions

Cycle through eight subtests and six grade versions

[1] Based on performance of n = 450 from CA, IL, FL.

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Number of reports on each level

Table (level)	Number	Name
For school districts (level 1)	8 x 6	Rhyming: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		First Sound Comparison: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Blending: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Deletion: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Letter Names: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Letter Sounds: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Phonemic Decoding Accuracy: Comparison of Regions to Multi-State Sample Average *Grade version, District*
		Reading Fluency: Comparison of Regions to Multi-State Sample Average *Grade version, District*
For regions (level 2)	8 x 6	Rhyming: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		First Sound Comparison: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		Blending: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		Deletion: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		Letter Names: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*

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		Letter Sounds: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		Phonemic Decoding Accuracy: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
		Reading Fluency: Comparison of Schools to Multi-State Sample Average *Grade version, Region, District*
For schools (level 3)	8 x 6	Rhyming: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		First Sound Comparison: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Blending: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Deletion: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Letter Names: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Letter Sounds: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Phonemic Decoding Accuracy: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*
		Reading Fluency: Comparison of Classes to Multi-State Sample Average *Grade version, School, Region, District*

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Raw Scores and Response Time for Each Student (This design is for CCI research – data analysis)

Student ID	Test Item 1.1				
	Response[1]	C (1) / I (0)[2]	R(1)/NR(0)[3]	Response Time (sec)[4]	Time Run-out[5]
Student 1	3	1	1	2	0
Student 2	9	0	1	40	1
Student 3	4	0	0	2	0
Student 4	3	1	0	3	0
Student 5	2	0	0	1	0
Student 6	9	0	1	35	1
Student 7	3	1	0	20	0
Student 8	2	0	1	20	0
Student 9	3	1	1	25	1

Statistics

Mean correct	Standard Deviation	Mean Time	Other
➢ Individual student test mean for each test item category	➢ Standard Deviation for Individual student test of each test item category	Mean time for Individual student test of each test item category	➢
➢ Individual student subtest mean	➢ Standard Deviation for Individual student subtest	Individual student subtest mean time	
➢ Individual student total test mean	➢ Standard Deviation for Individual student total test	Individual student total test mean time	
➢ Group mean for each test item[6]	➢ Standard Deviation for each test item in a group	Group mean time for each test item	
➢ Group mean for each test item category	➢ Standard Deviation for each test item category in a group	Group mean time for each test item category	
➢ Group mean for each subtest	➢ Standard Deviation for each subtest in a group	Group mean time for each subtest	
➢ Group mean for total test	➢ Standard Deviation for total test in a group	Group mean time for total test	

[1] One (1) to six (6) are used as students' response to test items; e.g., there are four choices for the test items in subtest one. They will be labeled as 1 to 4. If the student clicks the third picture, it will be recorded as 3. Nine (9) is recorded as no response.

[2] One (1) for correct answer and 0 for incorrect answer.

[3] One (1) for having presented instructions twice and 0 for having presented instructions only once.

[4] When there is no response for 20 seconds, instructions will be repeated automatically; if there is no response for another 20 seconds, the screen flips to the next test item. No response will be coded as 0 (incorrect) and time 40 seconds (see student 2). Instructions can only be repeated once. If the student clicks repeat button but does not answer the question for 20 seconds from the repeated instruction, the screen will flip to the next test item (see student 6).

[5] One (1) for time run-out (see student 2) and 0 for student spending 20 seconds to answer the question before the instruction is repeated (see student 7).

[6] Group mean for each test item will be for internal analysis only

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Access to data

- CCI has secured access to all the data recorded (need statement of security and permission)
- School districts have secured access to their school district students' data
- Regions have secured access to their region school students' data
- Schools have secured access to their school students' data
- Class teachers have secured access to their class students' data
- Parents have secured access to their own children's data

Other

- Include an On/Off option for limiting time allowed for user responses[1]
- Include an On/Off option for limiting number of times instructions repeated[2]

[1] Add disclaimers: Turning off limited time for response and/or limited repetition of instructions prevents valid assessment of skills and comparison of scores across subjects and comparison of pre-test vs. post-test.

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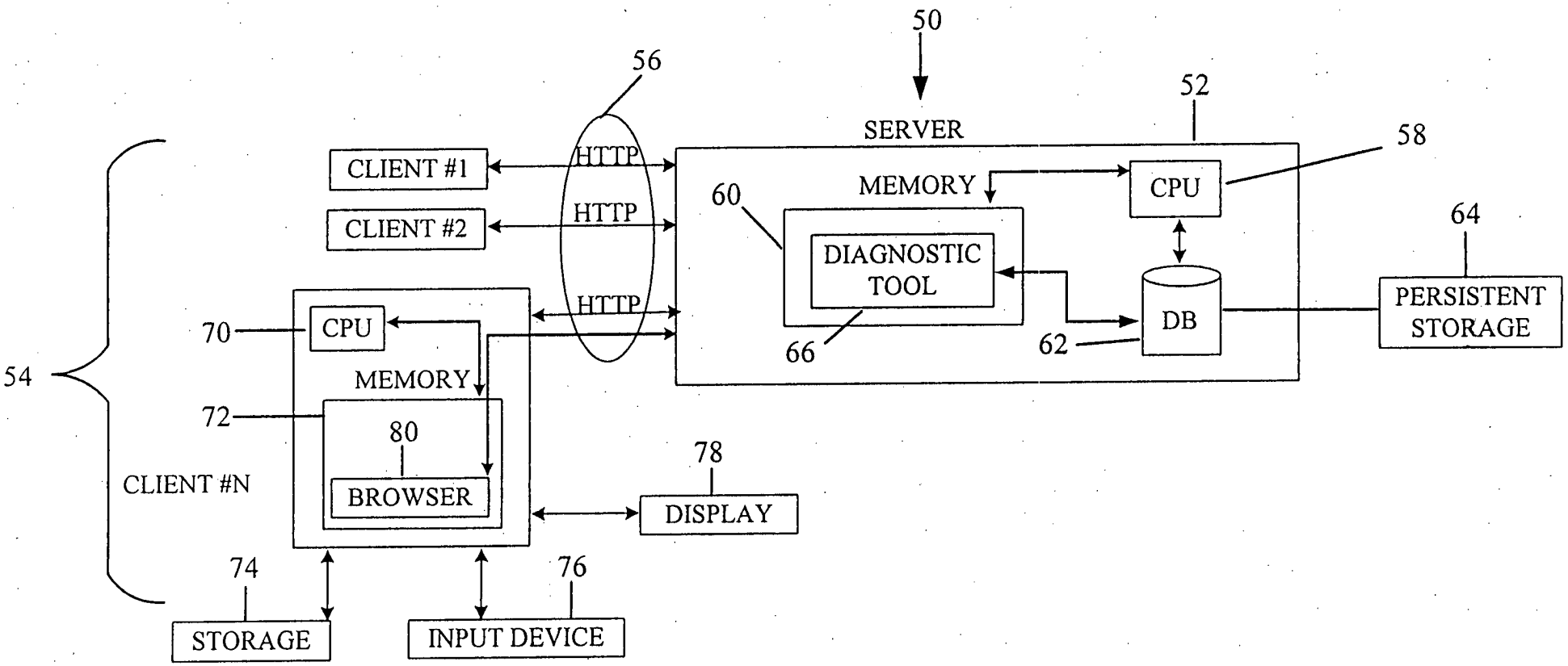


Figure 1A

2100632-991121

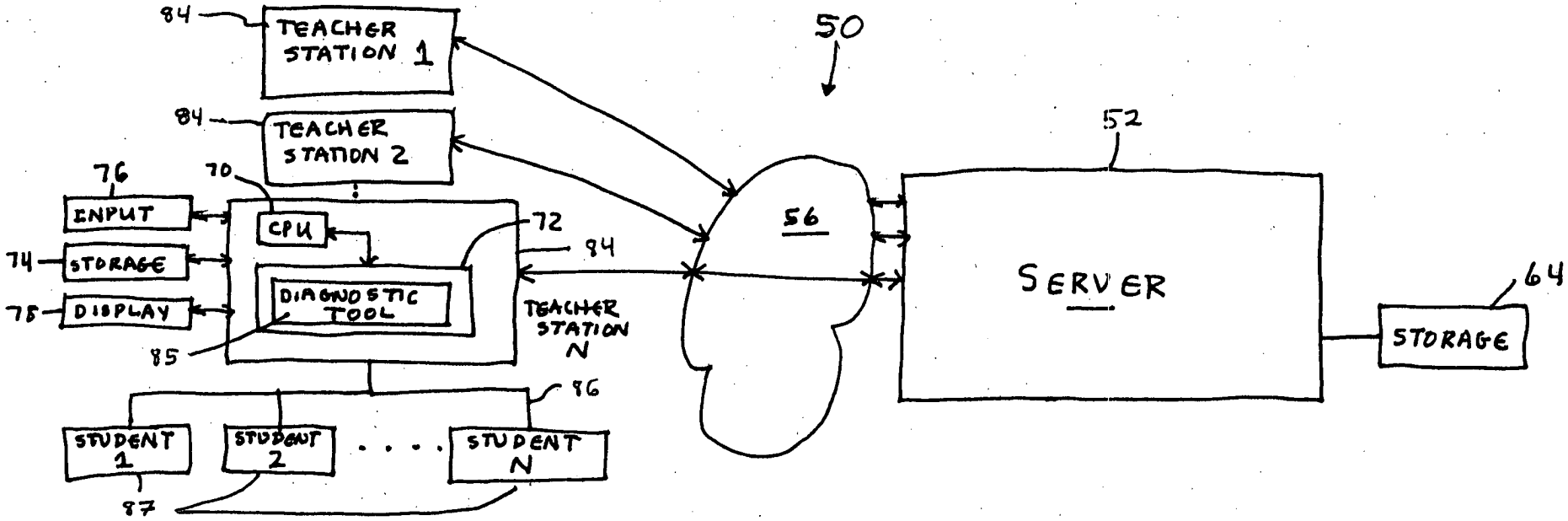


FIGURE 1B

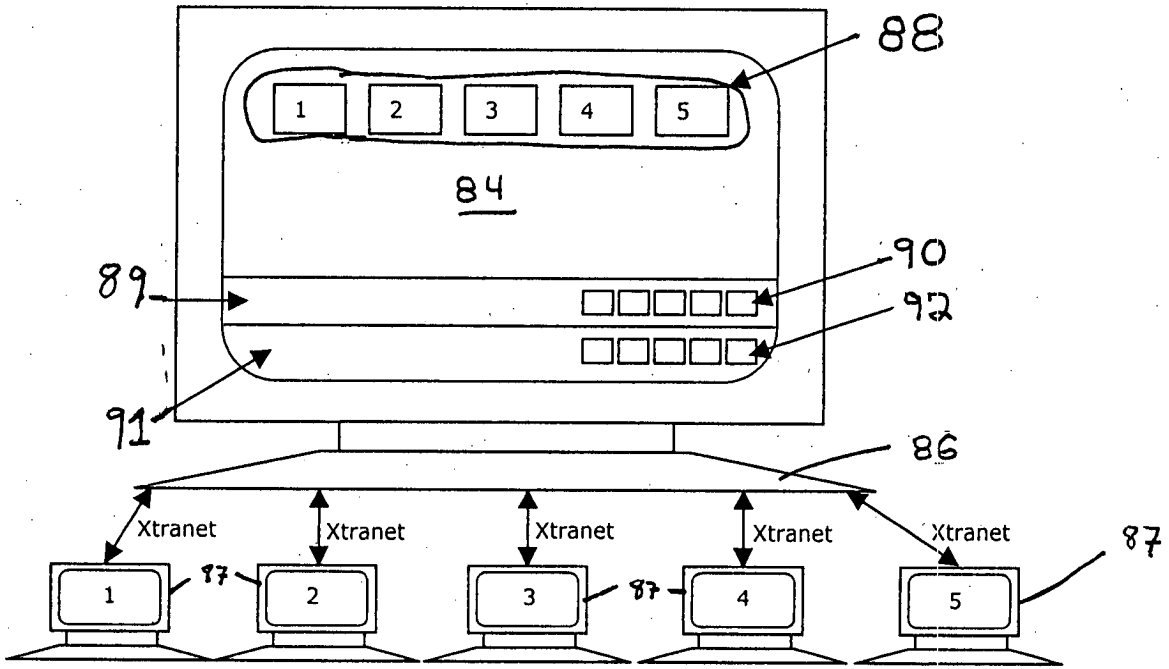


FIGURE 1C

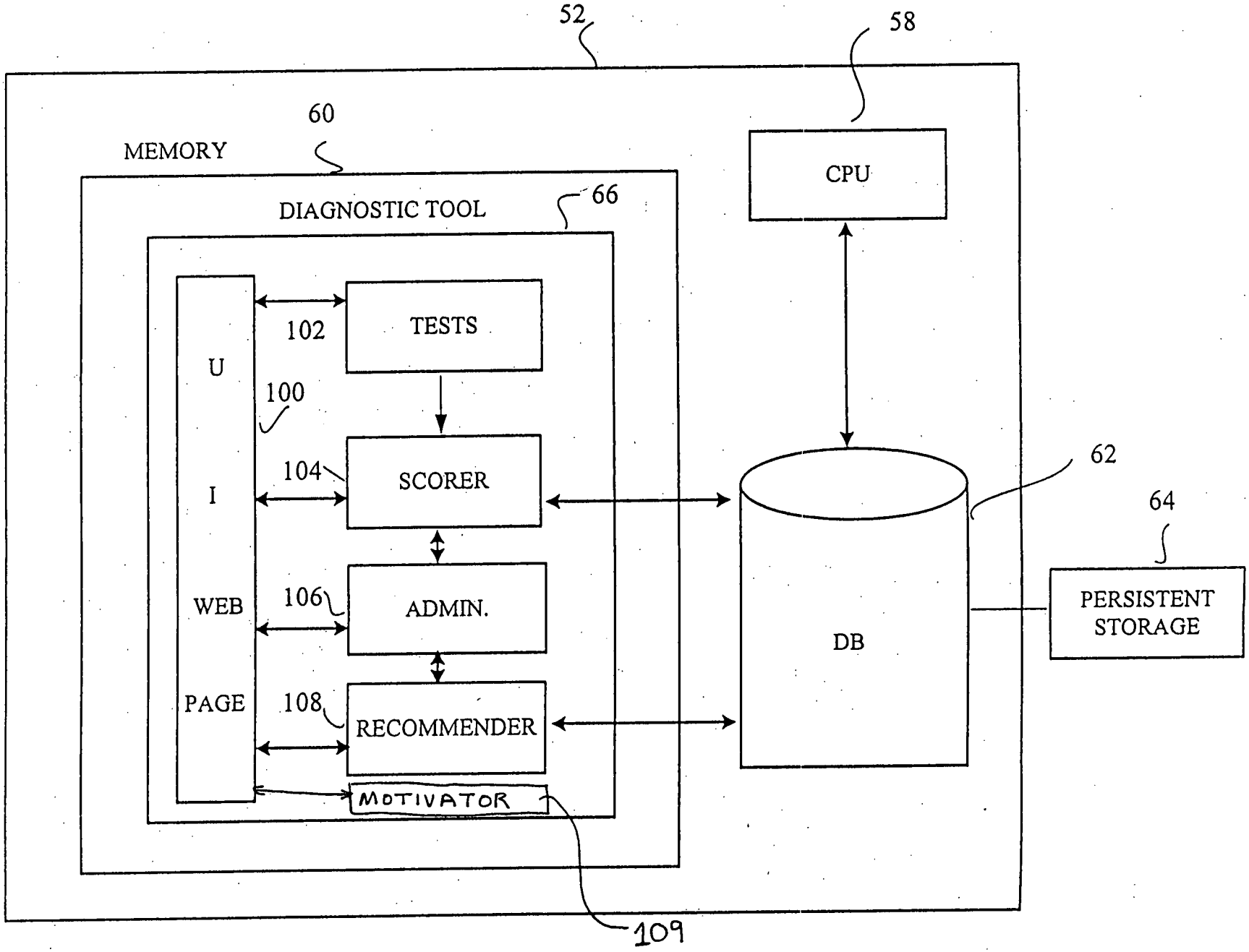

52
58
60
MEMORY
CPU
DIAGNOSTIC TOOL
66
U
I
WEB
PAGE
100
102
TESTS
104
SCORER
106
ADMIN.
108
RECOMMENDER
MOTIVATOR
109
62
64
DB
PERSISTENT
STORAGE

Figure 2

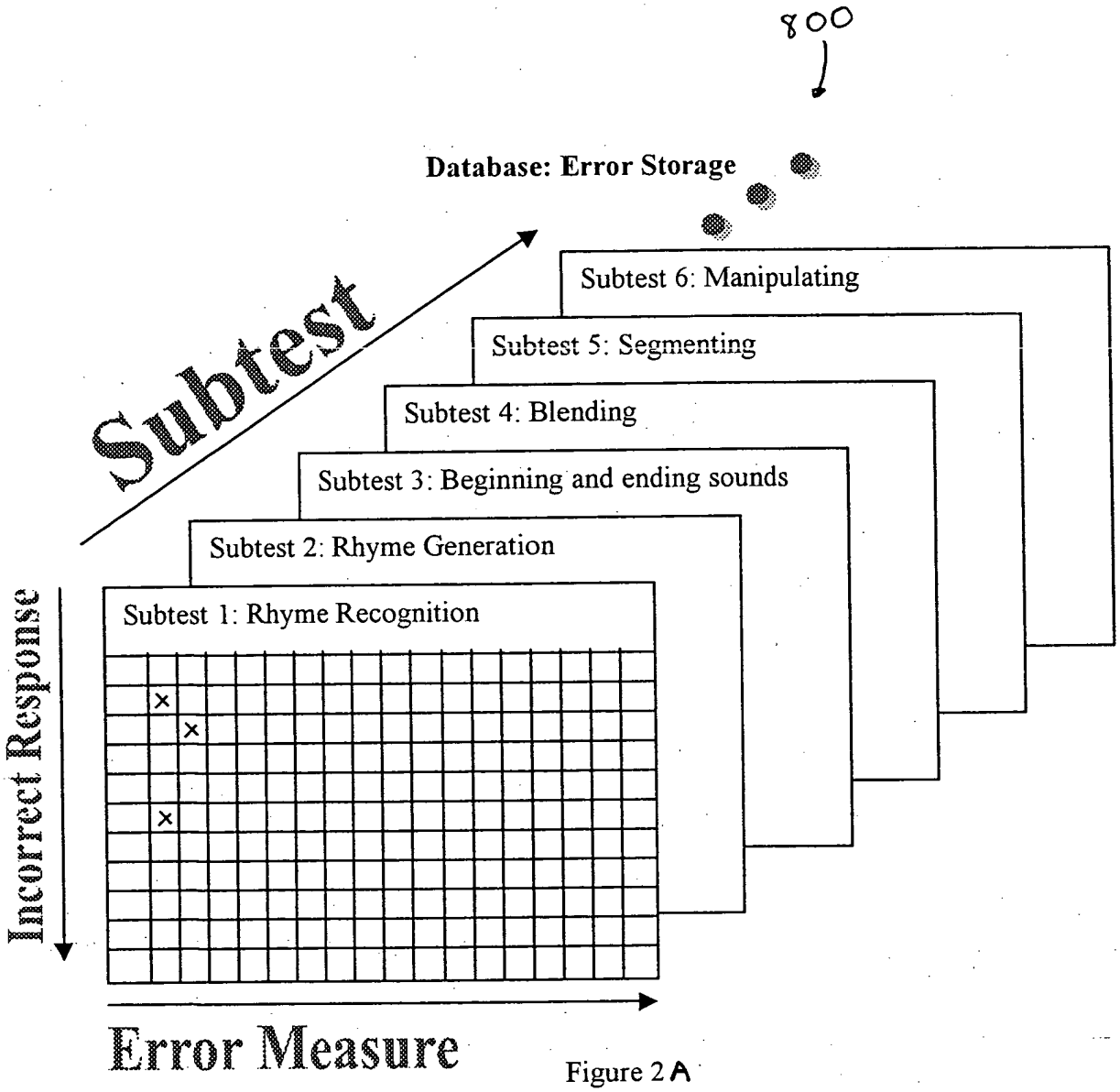
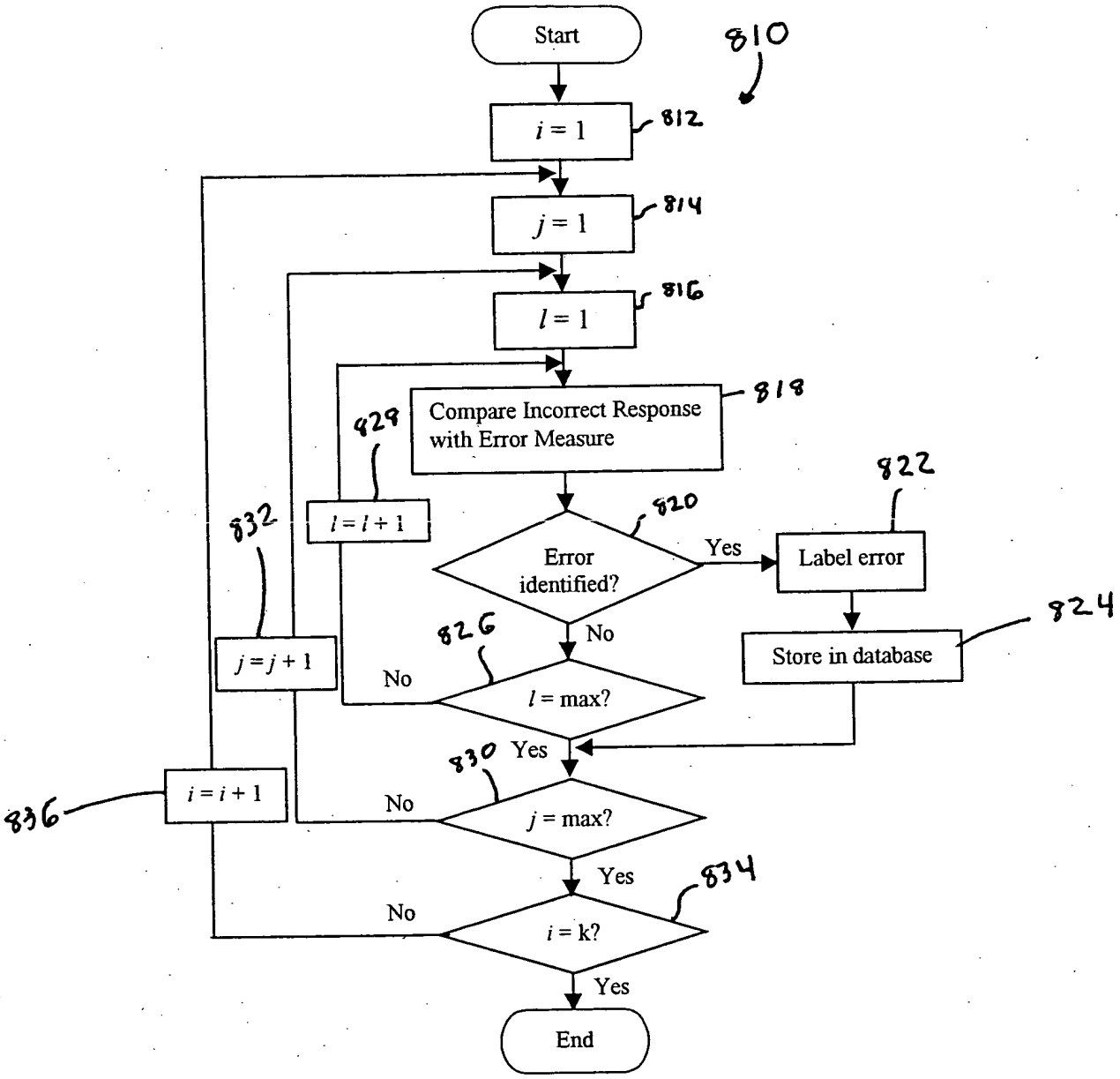

800
Database: Error Storage
Subtest
Subtest 6: Manipulating
Subtest 5: Segmenting
Subtest 4: Blending
Subtest 3: Beginning and ending sounds
Subtest 2: Rhyme Generation
Subtest 1: Rhyme Recognition
Incorrect Response
Error Measure

Figure 2A



$(ST)_i$: Subtest; $i = 1 \ldots k$

$(IR)_{ij}$: Incorrect Response; ij = 1.1, 1.2, …, 1. max., … k.1, k.2, …, k.max. ($j = 1 \ldots$ max.)

$(EM)_{il}$: Error Measure; il = 1.1, 1.2, …, 1.max., …k.1, k.2, …, k.max. ($l = 1 \ldots$ max. Note: max. for l is different from max. for j.)

Figure 2B

IF-THEN Rule Bases

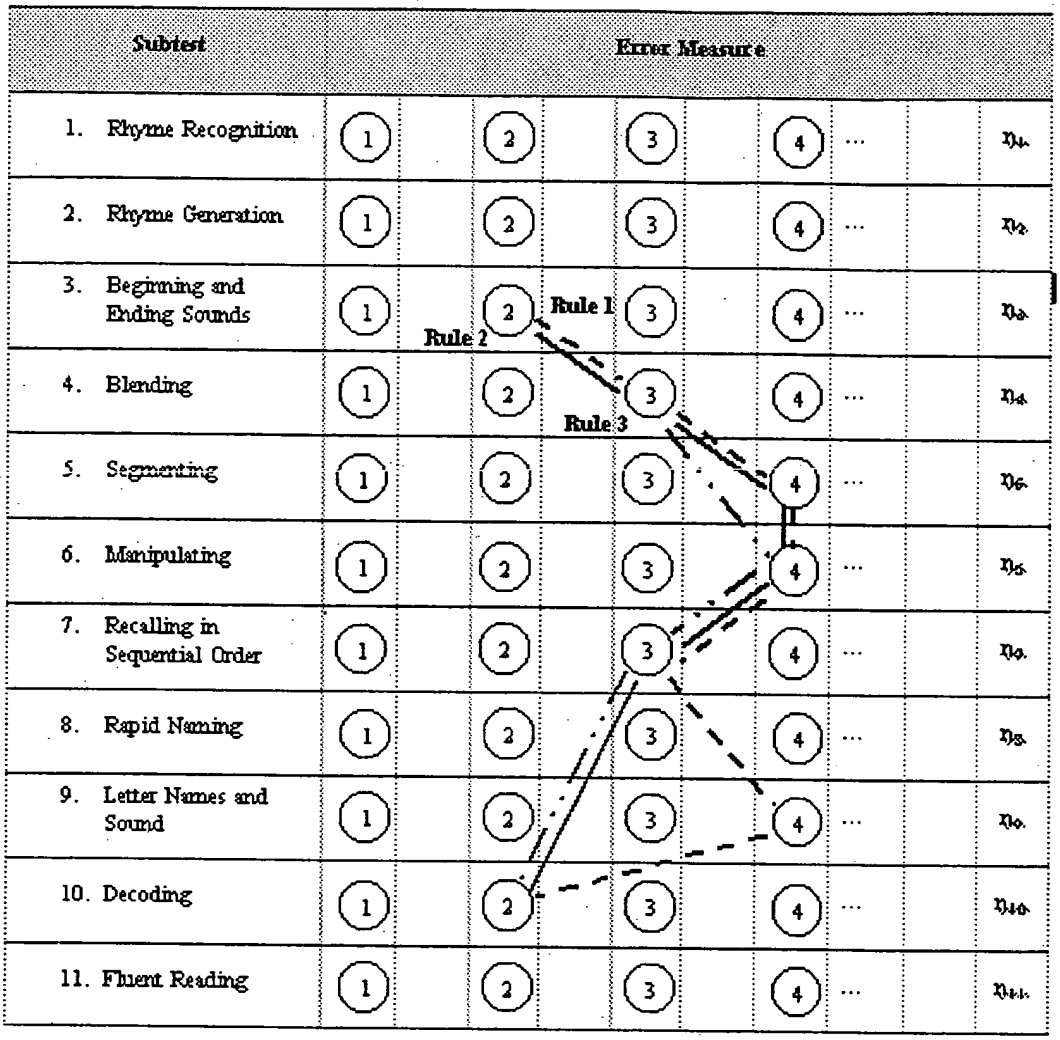


FIGURE 2C

Subtest	Error Measure ID	Error Measure
3. Beginning and Ending Sounds	2	Do not recognize /f/ when it is at the end following an /i/ sound
4. Blending	3	Can not blend when /f/ is at the end following an /e/ sound
5. Segmenting	4	Do not count /f/ when it is at the end following an /ʌ/ sound
6. Manipulating	4	Can not replace /f/ with /v/ when it is at the end following an /e/ sound
7. Recalling in Sequential Order	3	Do not recall /f/ when it is at the end following another consonant.
9. Letter Names and Sound	4	Can not recognize /f/ sound when it is isolated
10. Decoding	2	Cannot recognize the nonsense word when the word ends with a /f/ sound which follows another consonant

FIGURE 2D

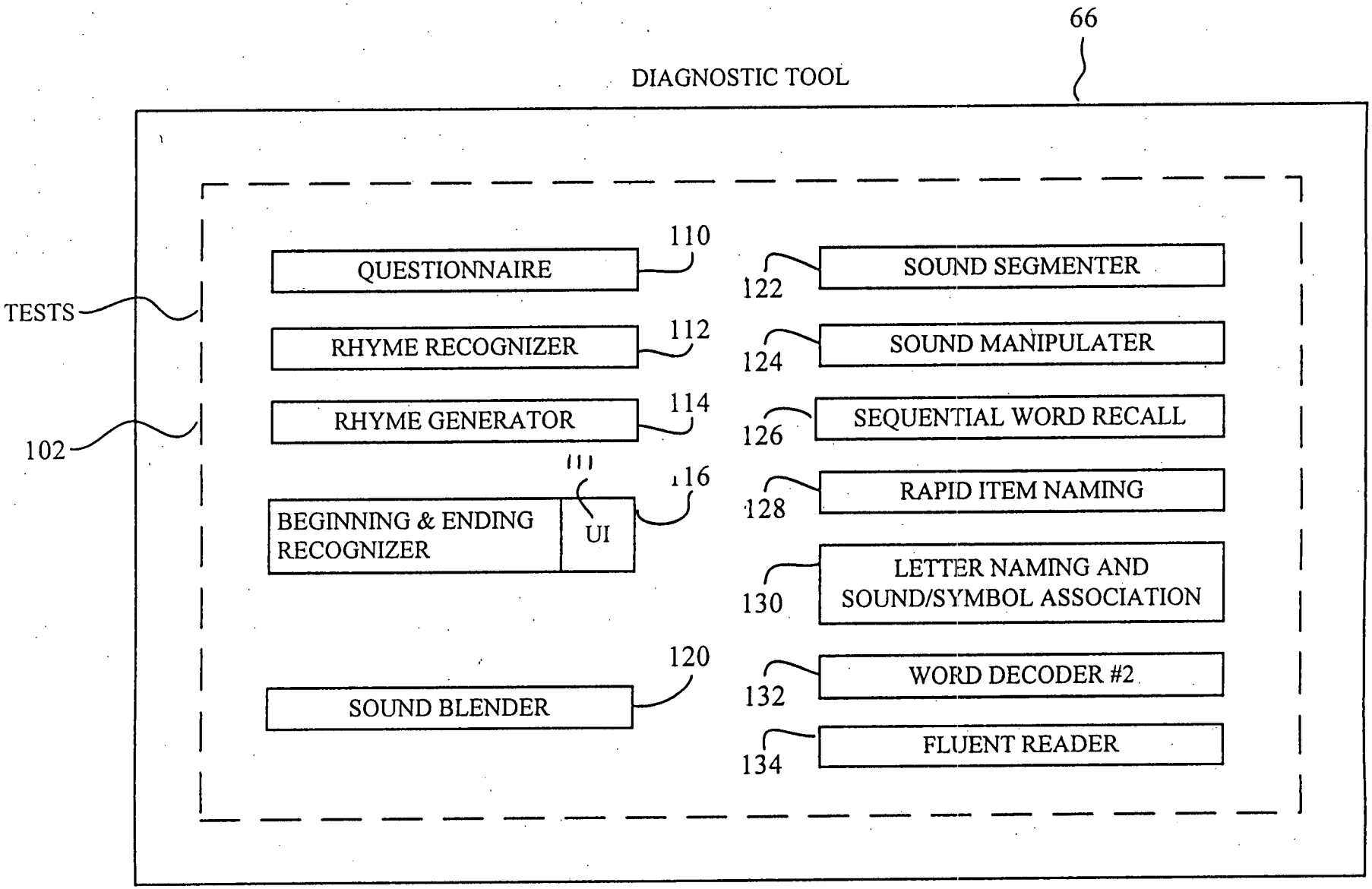

66
DIAGNOSTIC TOOL
TESTS
102
QUESTIONNAIRE
110
RHYME RECOGNIZER
112
RHYME GENERATOR
114
BEGINNING & ENDING RECOGNIZER
UI
111
116
SOUND BLENDER
120
SOUND SEGMENTER
122
SOUND MANIPULATER
124
SEQUENTIAL WORD RECALL
126
RAPID ITEM NAMING
128
LETTER NAMING AND SOUND/SYMBOL ASSOCIATION
130
WORD DECODER #2
132
FLUENT READER
134

Figure 3

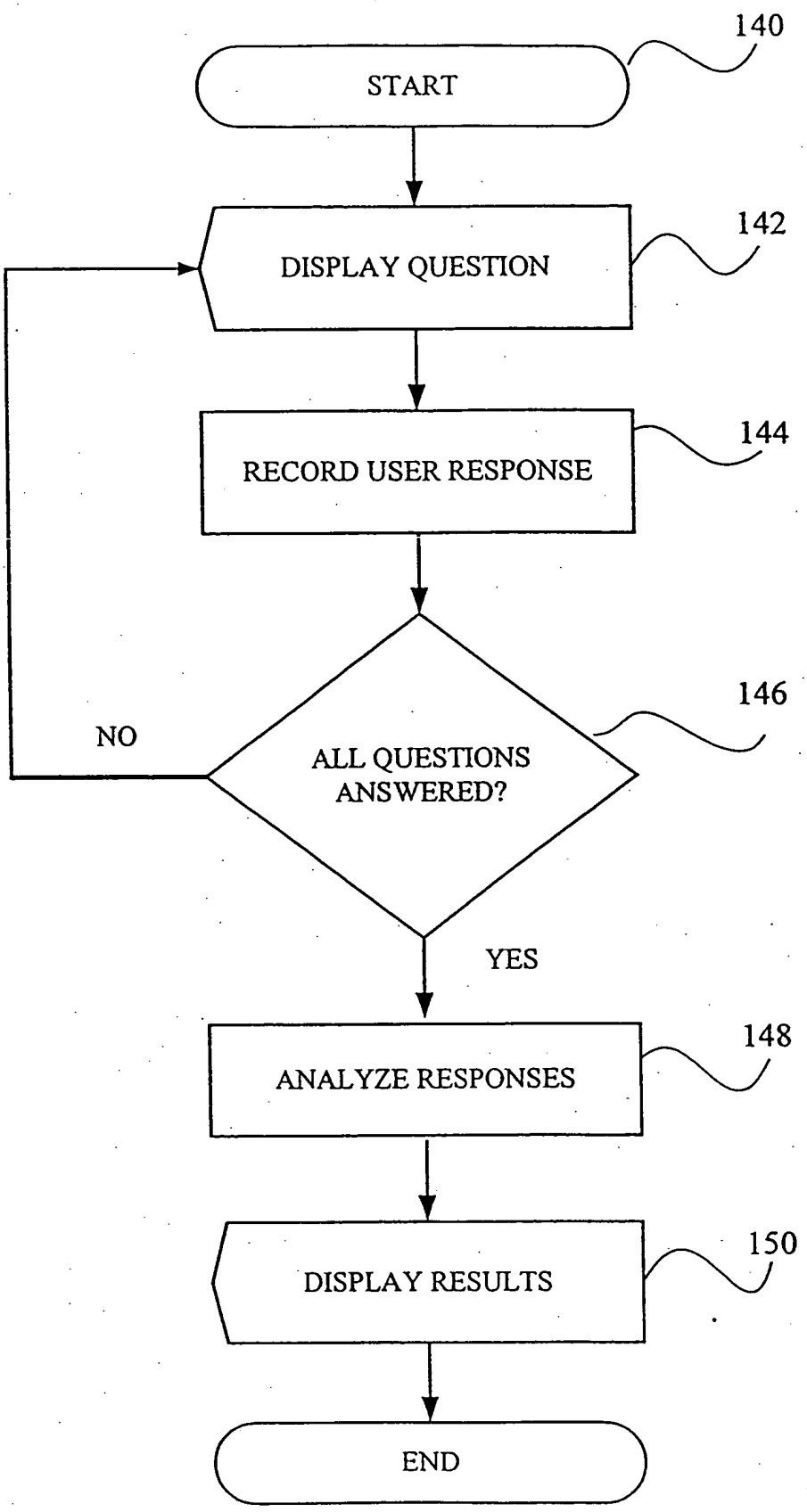

140
START
142
DISPLAY QUESTION
144
RECORD USER RESPONSE
146
ALL QUESTIONS ANSWERED?
NO
YES
148
ANALYZE RESPONSES
150
DISPLAY RESULTS
END

Figure 4

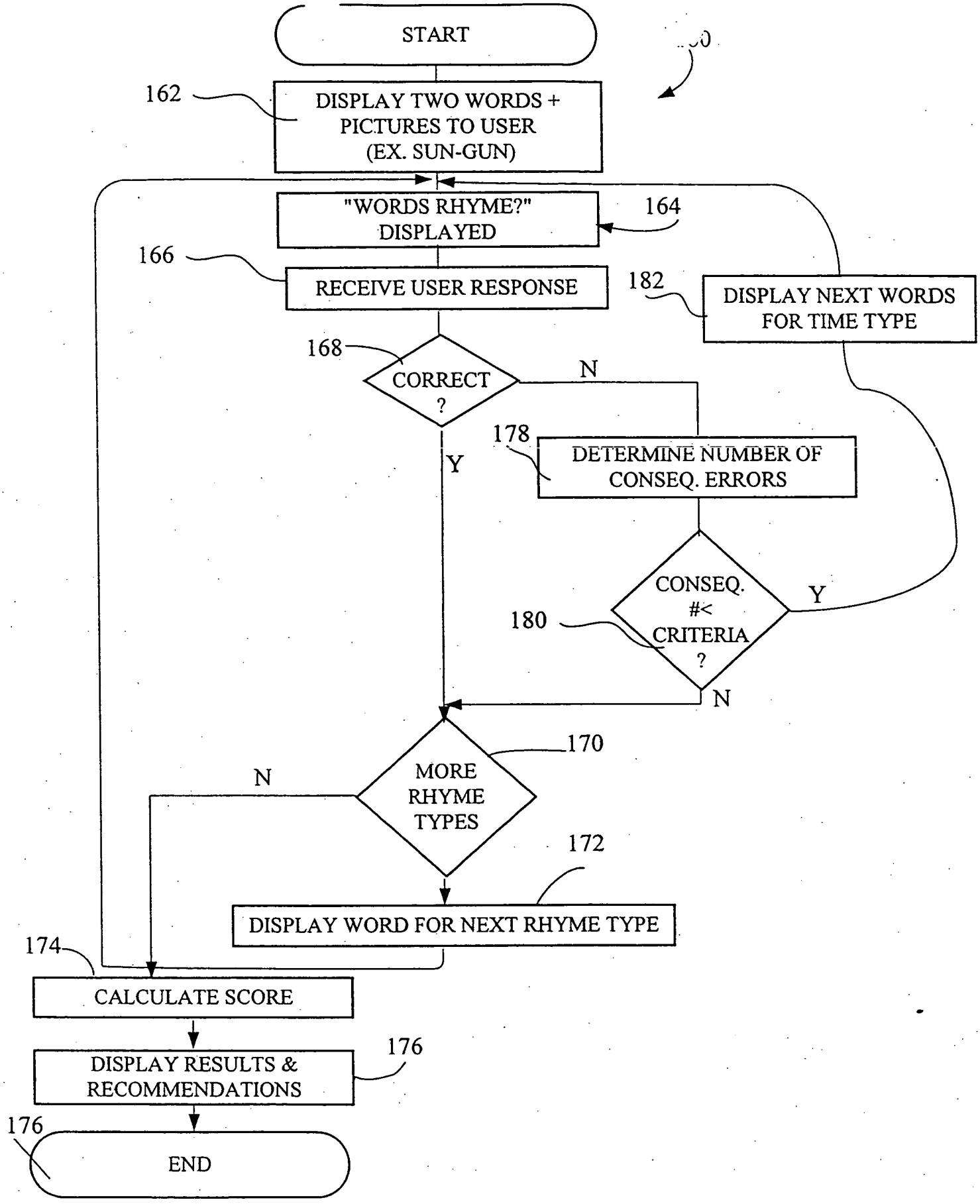

START
160
162
DISPLAY TWO WORDS + PICTURES TO USER (EX. SUN-GUN)
"WORDS RHYME?" DISPLAYED
164
166
RECEIVE USER RESPONSE
182
DISPLAY NEXT WORDS FOR TIME TYPE
168
CORRECT ?
N
Y
178
DETERMINE NUMBER OF CONSEQ. ERRORS
CONSEQ. #< CRITERIA ?
Y
180
N
170
MORE RHYME TYPES
N
172
DISPLAY WORD FOR NEXT RHYME TYPE
174
CALCULATE SCORE
DISPLAY RESULTS & RECOMMENDATIONS
176
176
END

Figure 5

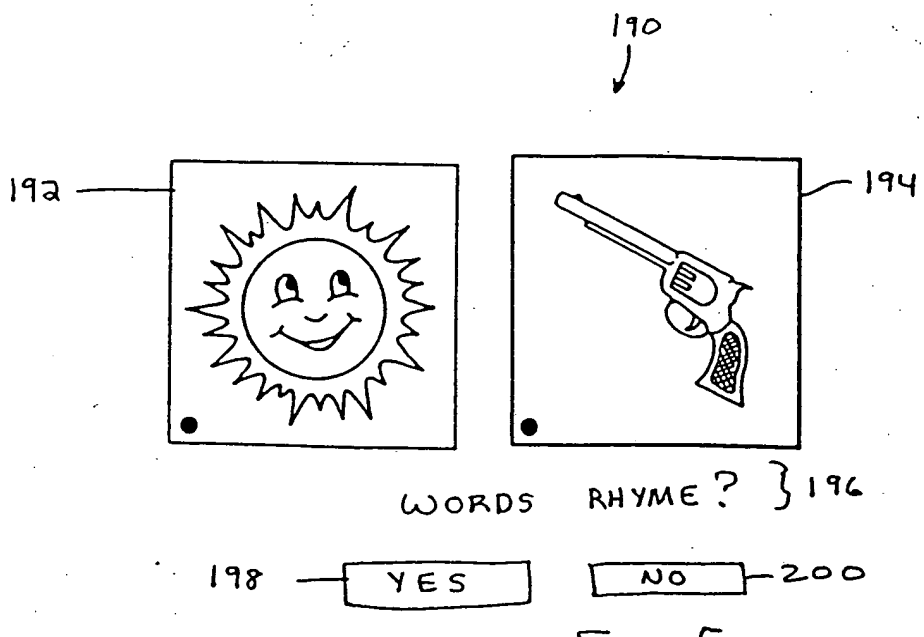


Figure 6

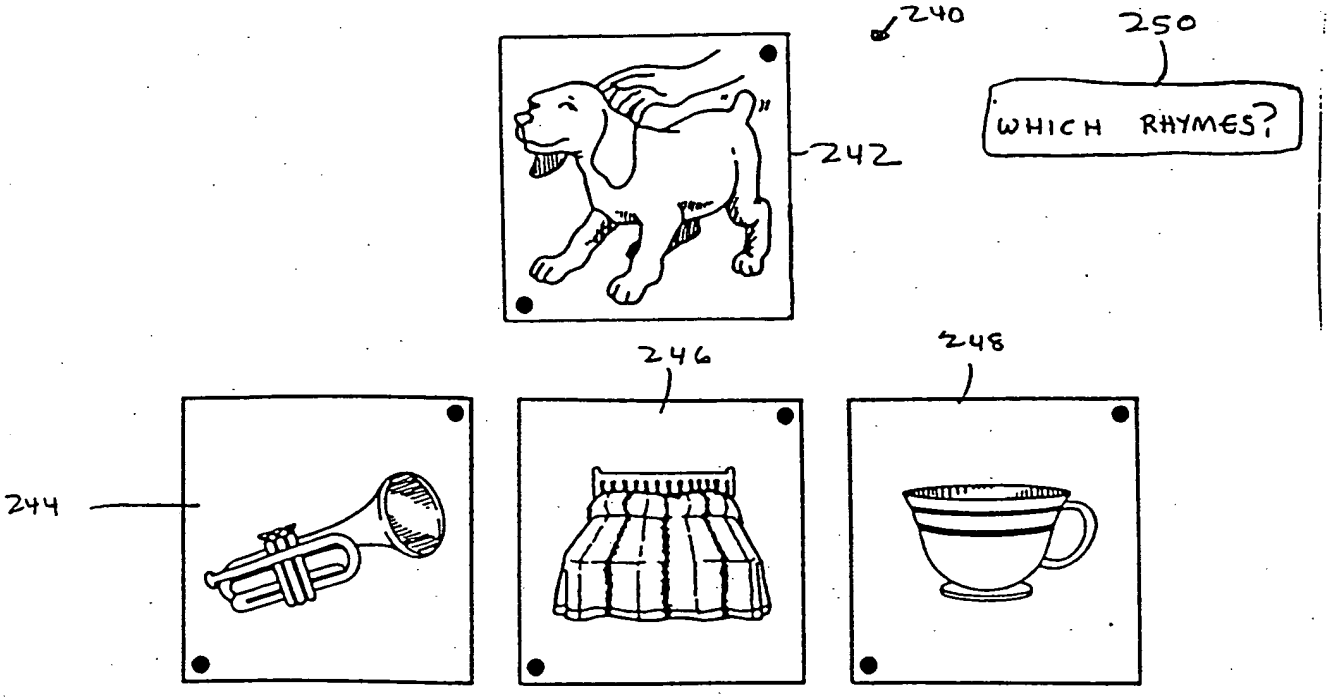


Figure 8

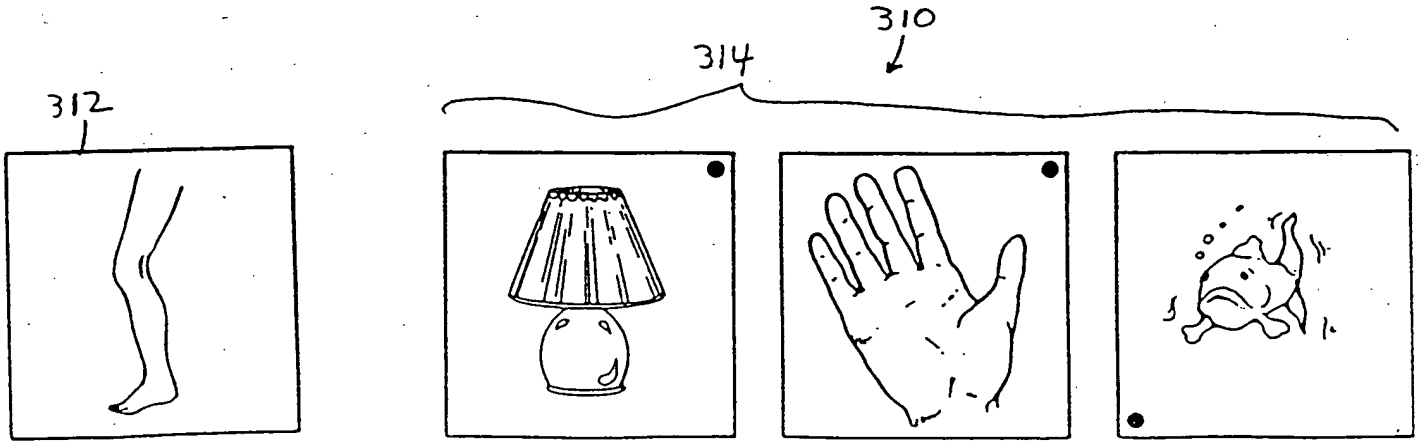


FIGURE 10

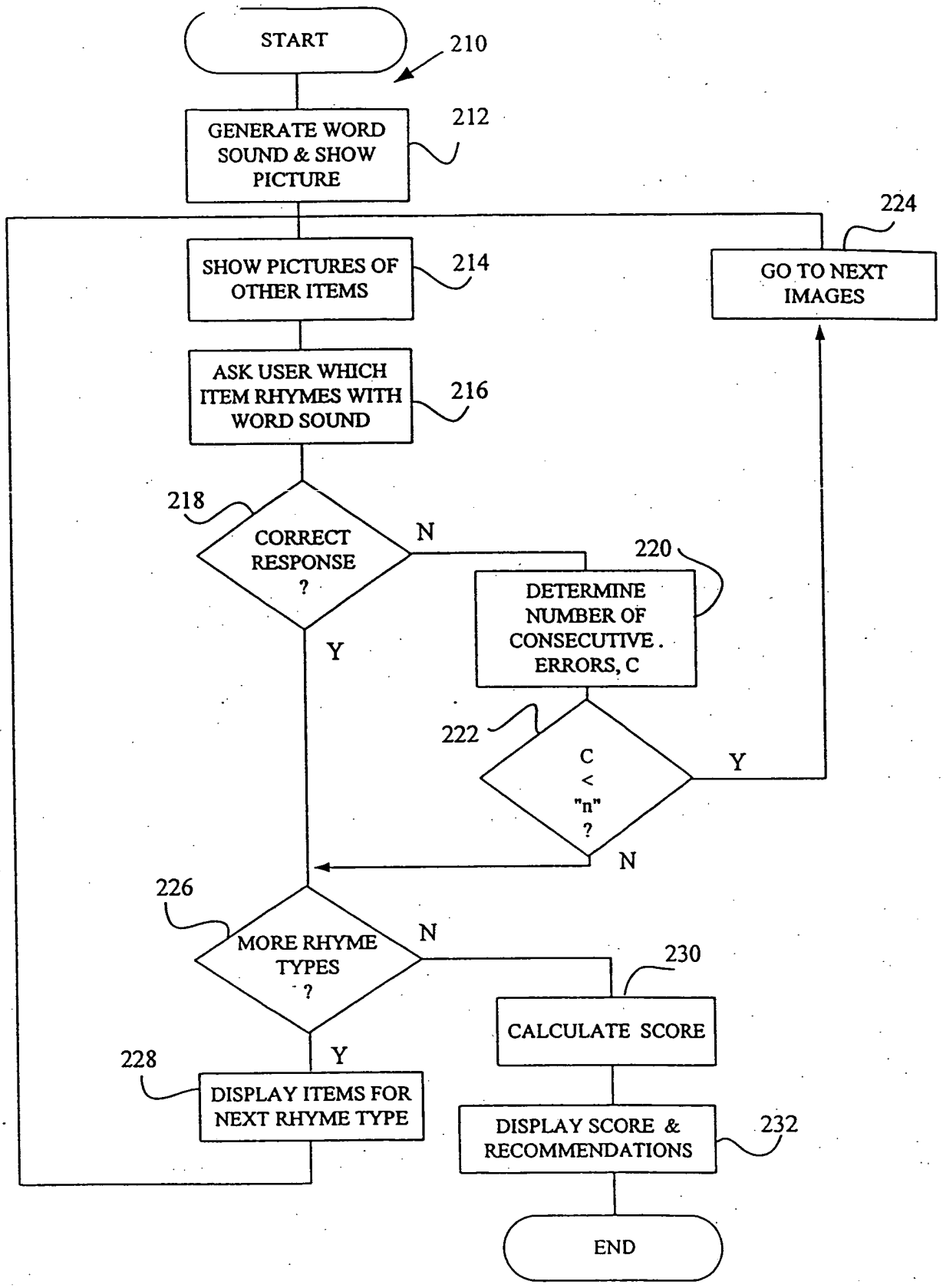

START
210
GENERATE WORD SOUND & SHOW PICTURE
212
SHOW PICTURES OF OTHER ITEMS
214
ASK USER WHICH ITEM RHYMES WITH WORD SOUND
216
218
CORRECT RESPONSE ?
N
Y
220
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
222
C < "n" ?
Y
N
224
GO TO NEXT IMAGES
226
MORE RHYME TYPES ?
N
Y
228
DISPLAY ITEMS FOR NEXT RHYME TYPE
230
CALCULATE SCORE
DISPLAY SCORE & RECOMMENDATIONS
232
END

Figure 7

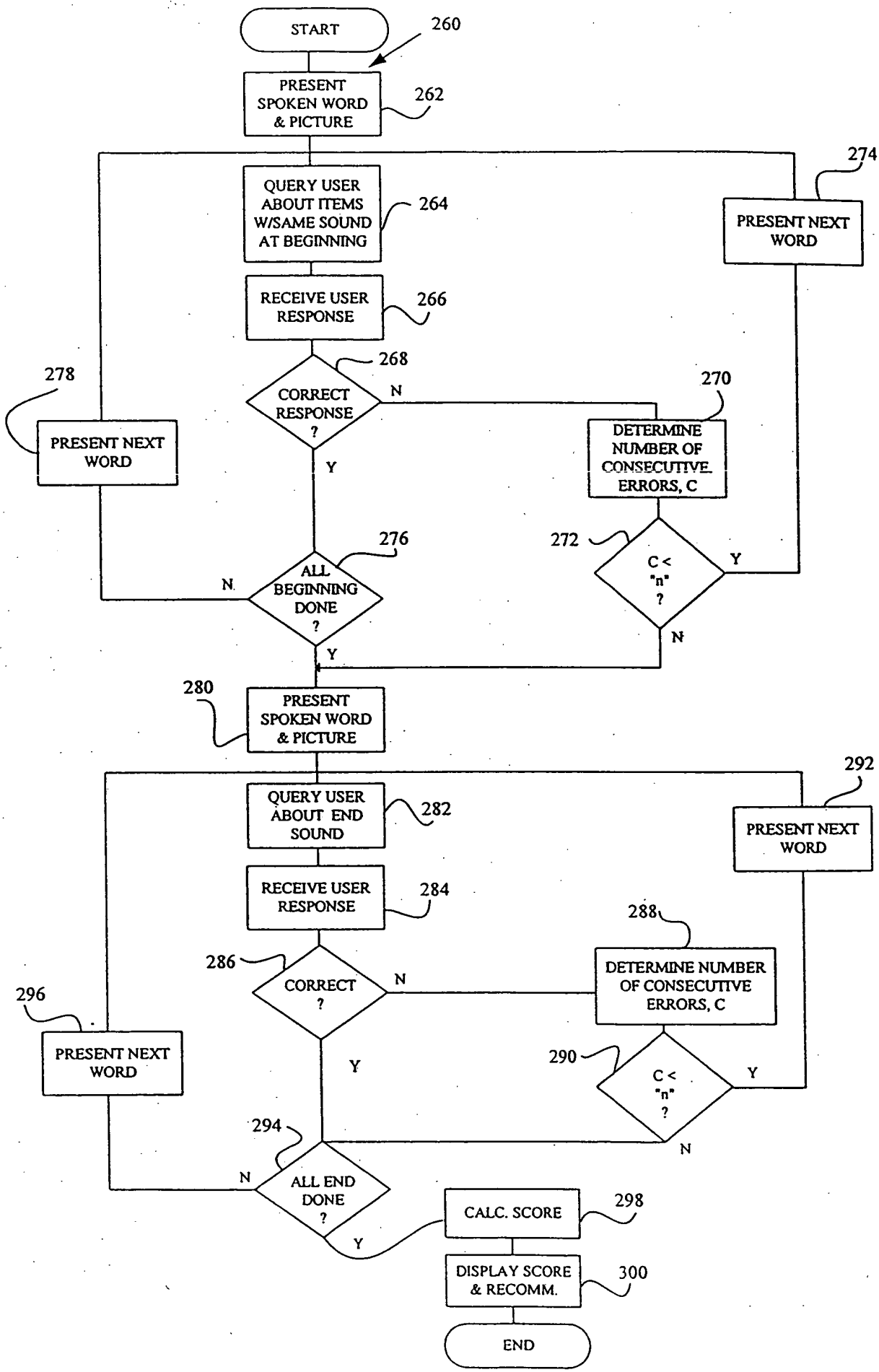

START
260
PRESENT SPOKEN WORD & PICTURE
262
QUERY USER ABOUT ITEMS W/SAME SOUND AT BEGINNING
264
RECEIVE USER RESPONSE
266
268
CORRECT RESPONSE ?
N
Y
270
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
272
C < "n" ?
Y
N
274
PRESENT NEXT WORD
278
PRESENT NEXT WORD
276
ALL BEGINNING DONE ?
N
Y
280
PRESENT SPOKEN WORD & PICTURE
292
QUERY USER ABOUT END SOUND
282
RECEIVE USER RESPONSE
284
288
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
286
CORRECT ?
N
Y
290
C < "n" ?
Y
N
PRESENT NEXT WORD
296
PRESENT NEXT WORD
294
ALL END DONE ?
N
Y
CALC. SCORE
298
DISPLAY SCORE & RECOMM.
300
END

Figure 9

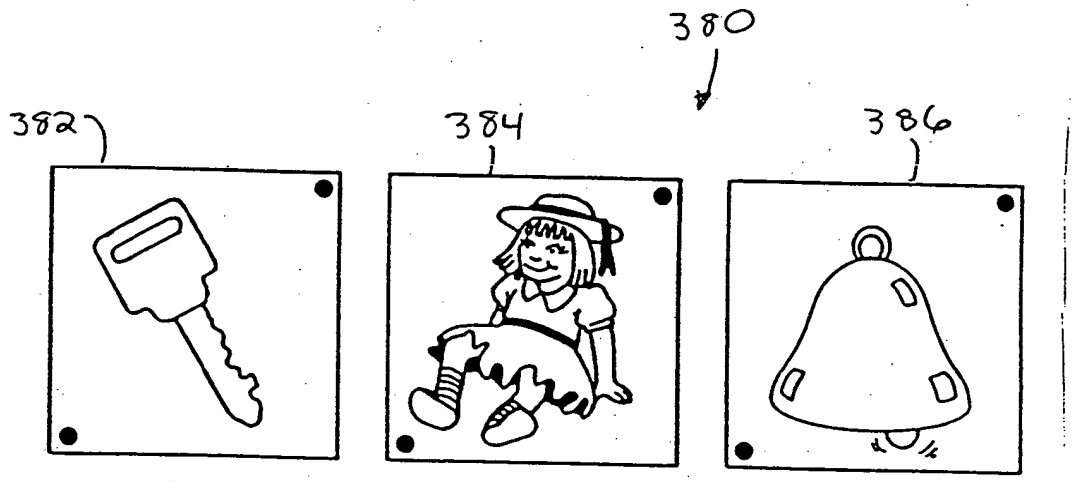


Figure 12

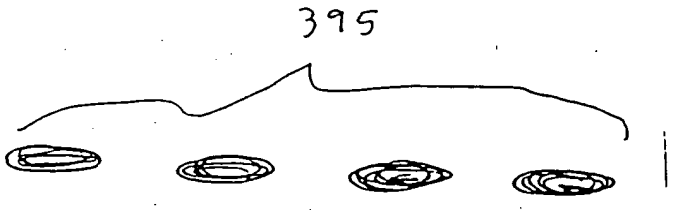


Figure 14

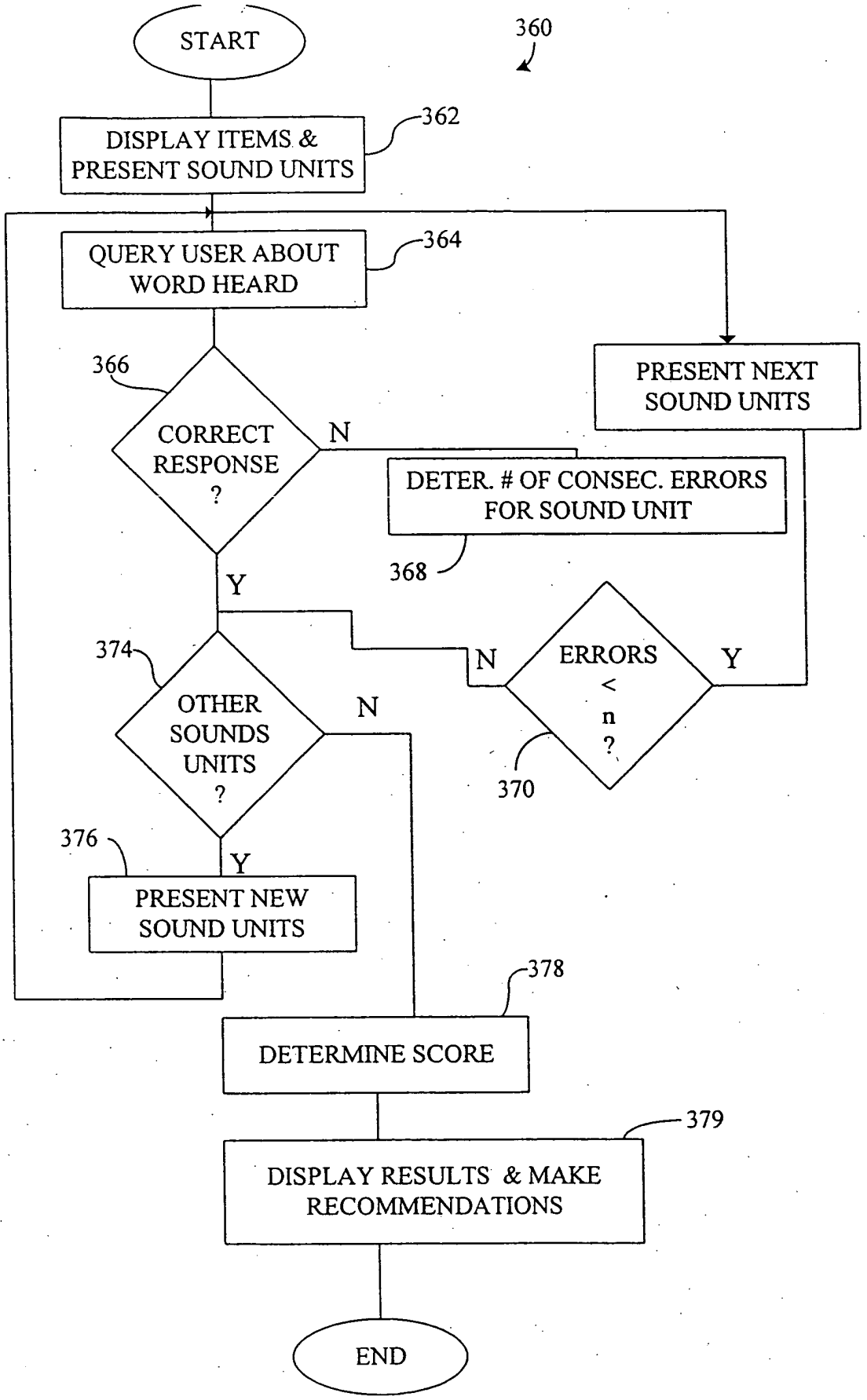

START
360
DISPLAY ITEMS & PRESENT SOUND UNITS
362
QUERY USER ABOUT WORD HEARD
364
366
CORRECT RESPONSE ?
N
PRESENT NEXT SOUND UNITS
DETER. # OF CONSEC. ERRORS FOR SOUND UNIT
368
Y
374
OTHER SOUNDS UNITS ?
N
N
ERRORS < n ?
Y
370
376
Y
PRESENT NEW SOUND UNITS
378
DETERMINE SCORE
379
DISPLAY RESULTS & MAKE RECOMMENDATIONS
END

Figure 11

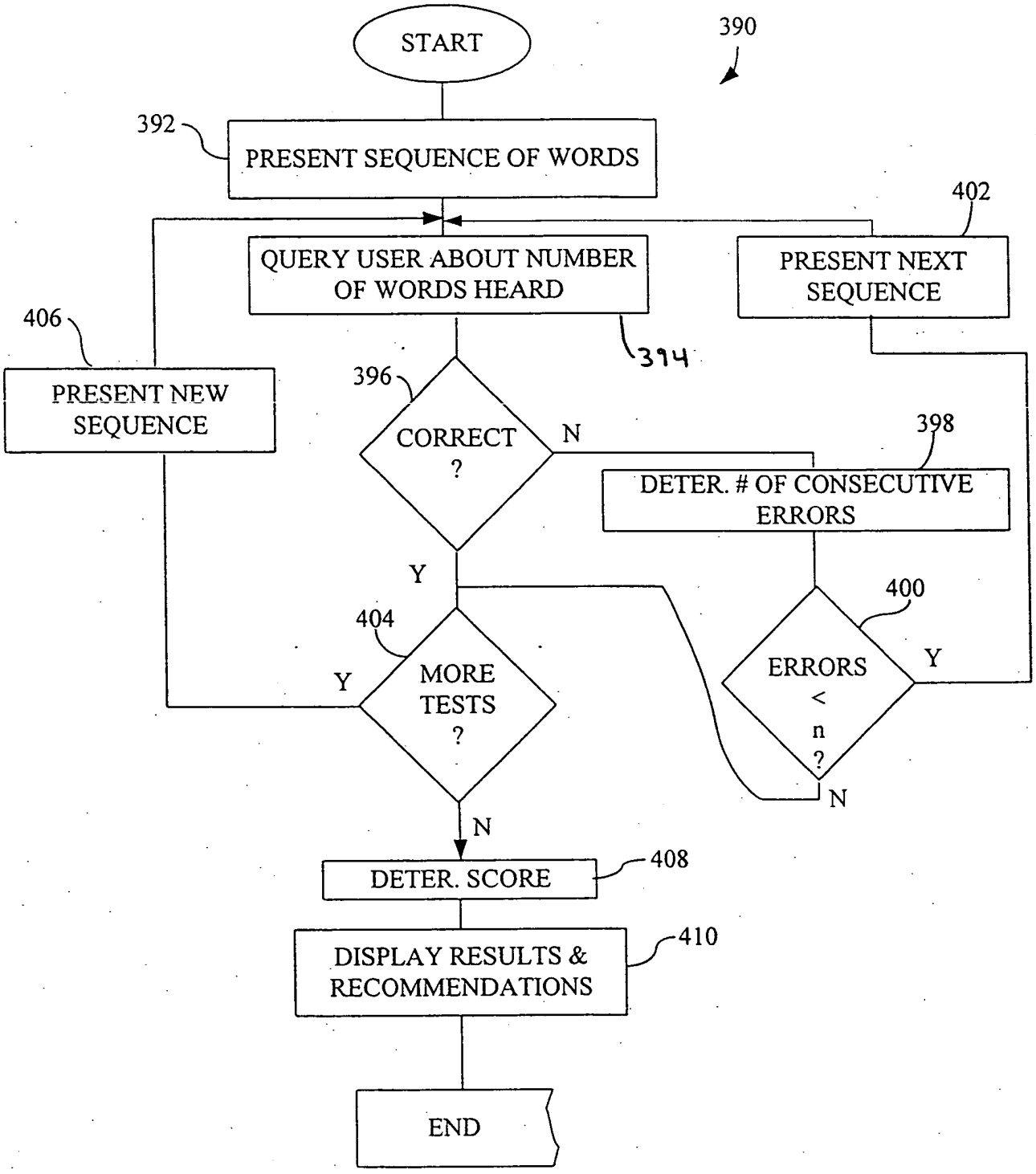

START
390
392
PRESENT SEQUENCE OF WORDS
402
QUERY USER ABOUT NUMBER OF WORDS HEARD
PRESENT NEXT SEQUENCE
406
394
PRESENT NEW SEQUENCE
396
CORRECT ?
N
398
DETER. # OF CONSECUTIVE ERRORS
Y
400
404
Y
MORE TESTS ?
ERRORS < n ?
Y
N
N
408
DETER. SCORE
410
DISPLAY RESULTS & RECOMMENDATIONS
END

Figure 13

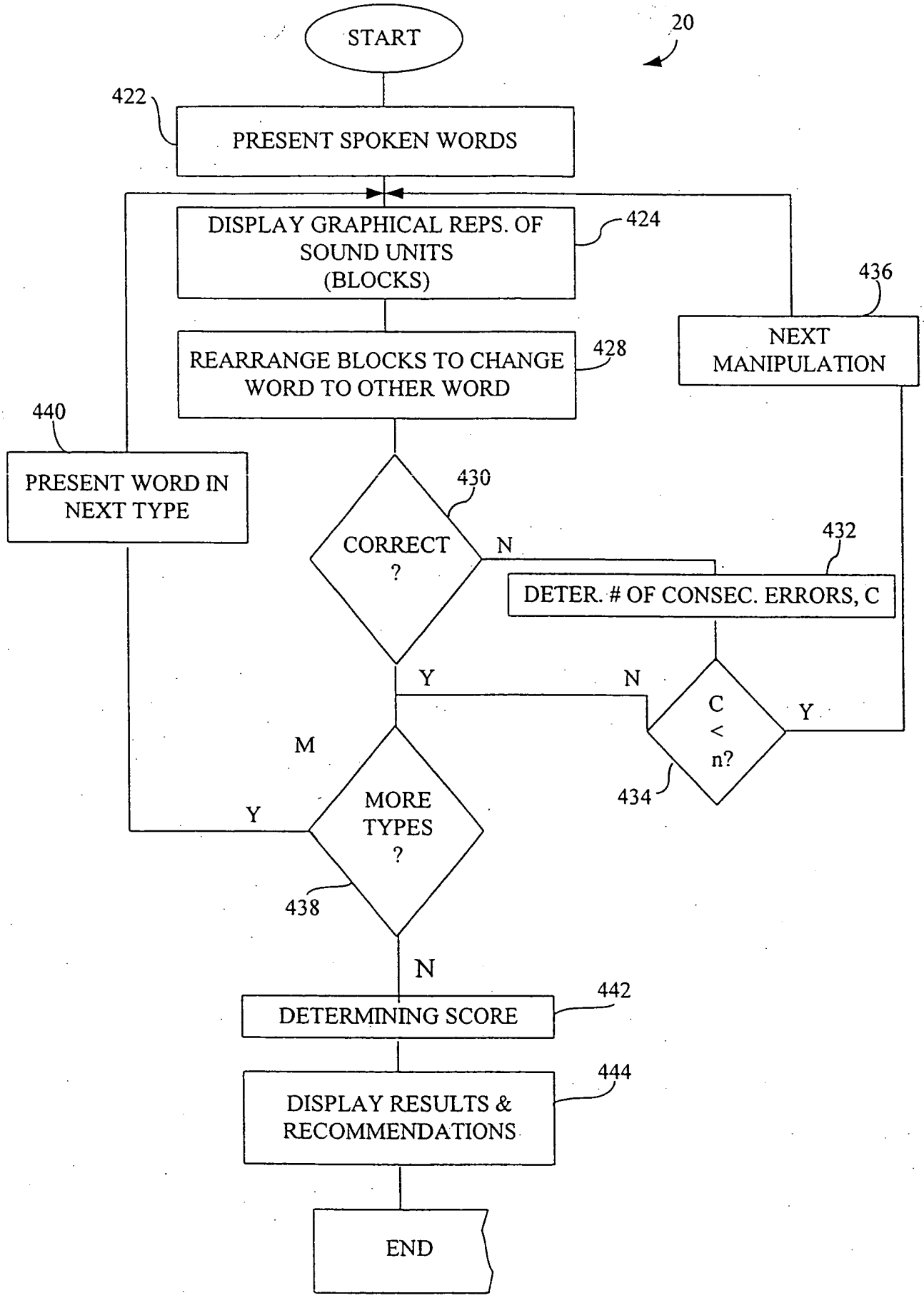

START
20
422
PRESENT SPOKEN WORDS
DISPLAY GRAPHICAL REPS. OF SOUND UNITS (BLOCKS)
424
436
NEXT MANIPULATION
REARRANGE BLOCKS TO CHANGE WORD TO OTHER WORD
428
440
PRESENT WORD IN NEXT TYPE
430
CORRECT ?
N
432
DETER. # OF CONSEC. ERRORS, C
Y
N
C < n?
Y
434
M
MORE TYPES ?
Y
438
N
442
DETERMINING SCORE
444
DISPLAY RESULTS & RECOMMENDATIONS
END

Figure 15

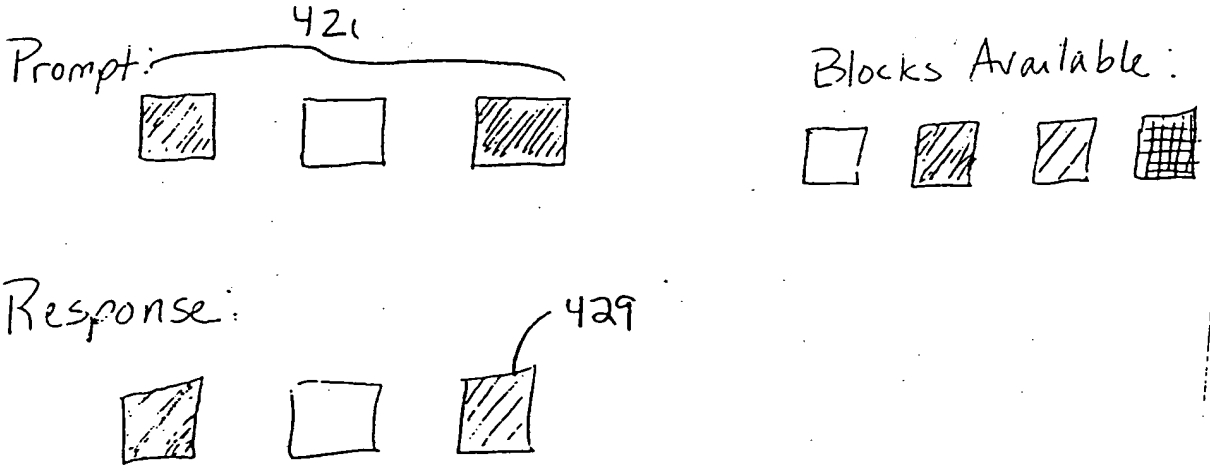


Figure 16

1	6	2
4		9
5	8	3

Figure 18

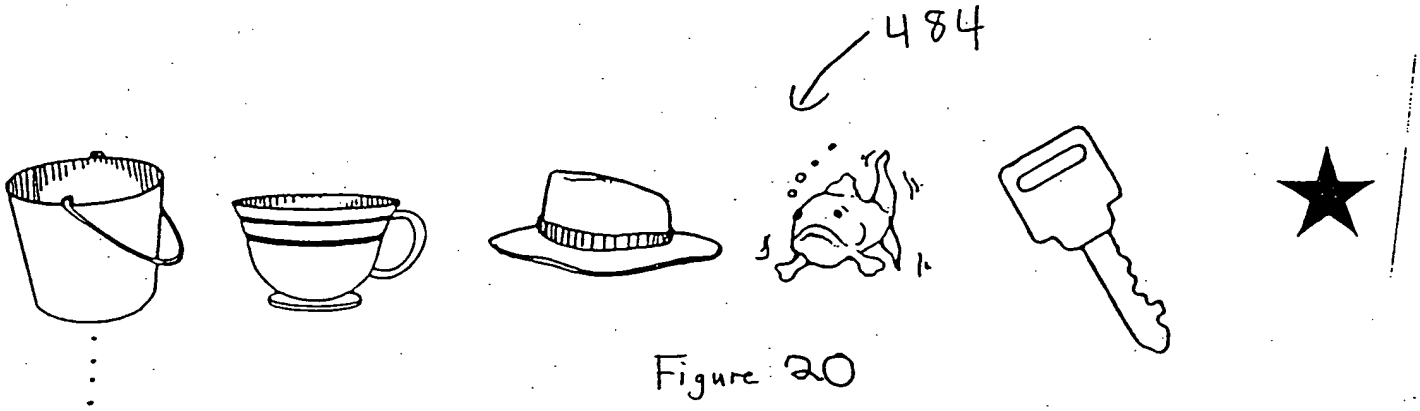


Figure 20

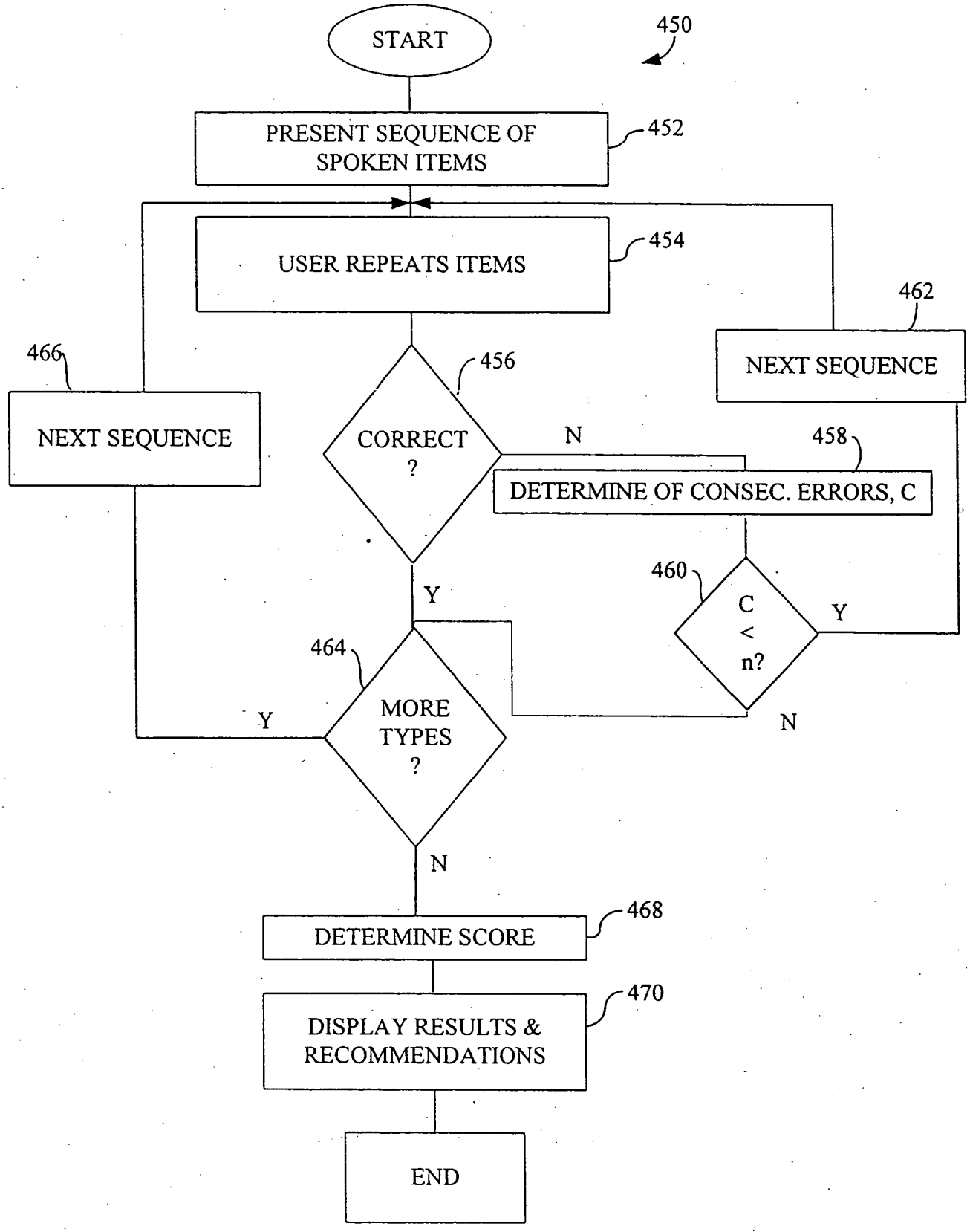

START
450
PRESENT SEQUENCE OF SPOKEN ITEMS
452
USER REPEATS ITEMS
454
462
NEXT SEQUENCE
466
NEXT SEQUENCE
456
CORRECT ?
N
458
DETERMINE OF CONSEC. ERRORS, C
460
C < n?
Y
Y
464
MORE TYPES ?
Y
N
N
468
DETERMINE SCORE
470
DISPLAY RESULTS & RECOMMENDATIONS
END

Figure 17

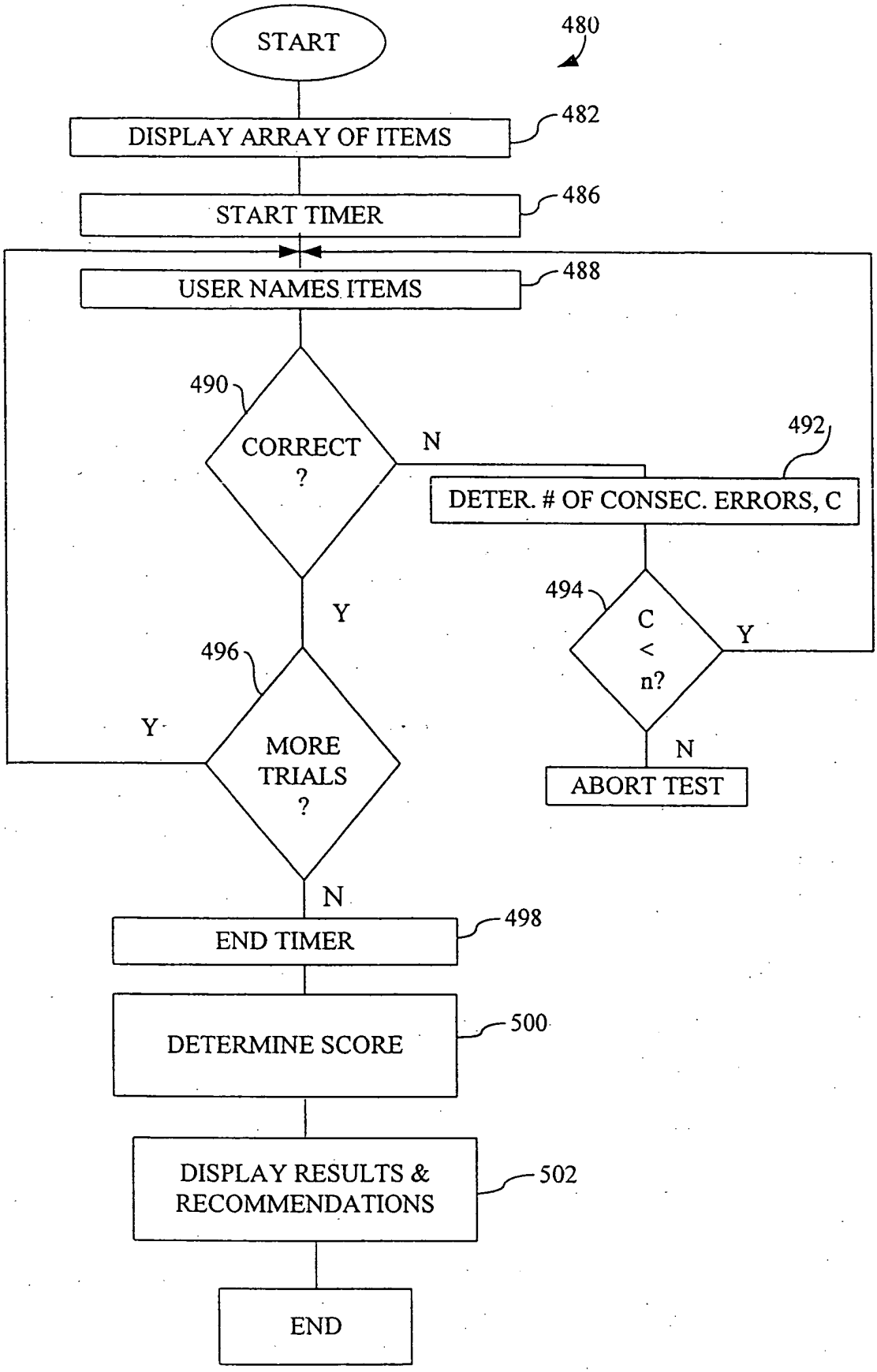

START
480
DISPLAY ARRAY OF ITEMS
482
START TIMER
486
USER NAMES ITEMS
488
490
CORRECT ?
N
492
DETER. # OF CONSEC. ERRORS, C
494
C < n?
Y
N
ABORT TEST
Y
496
MORE TRIALS ?
Y
N
END TIMER
498
DETERMINE SCORE
500
DISPLAY RESULTS & RECOMMENDATIONS
502
END

Figure 19

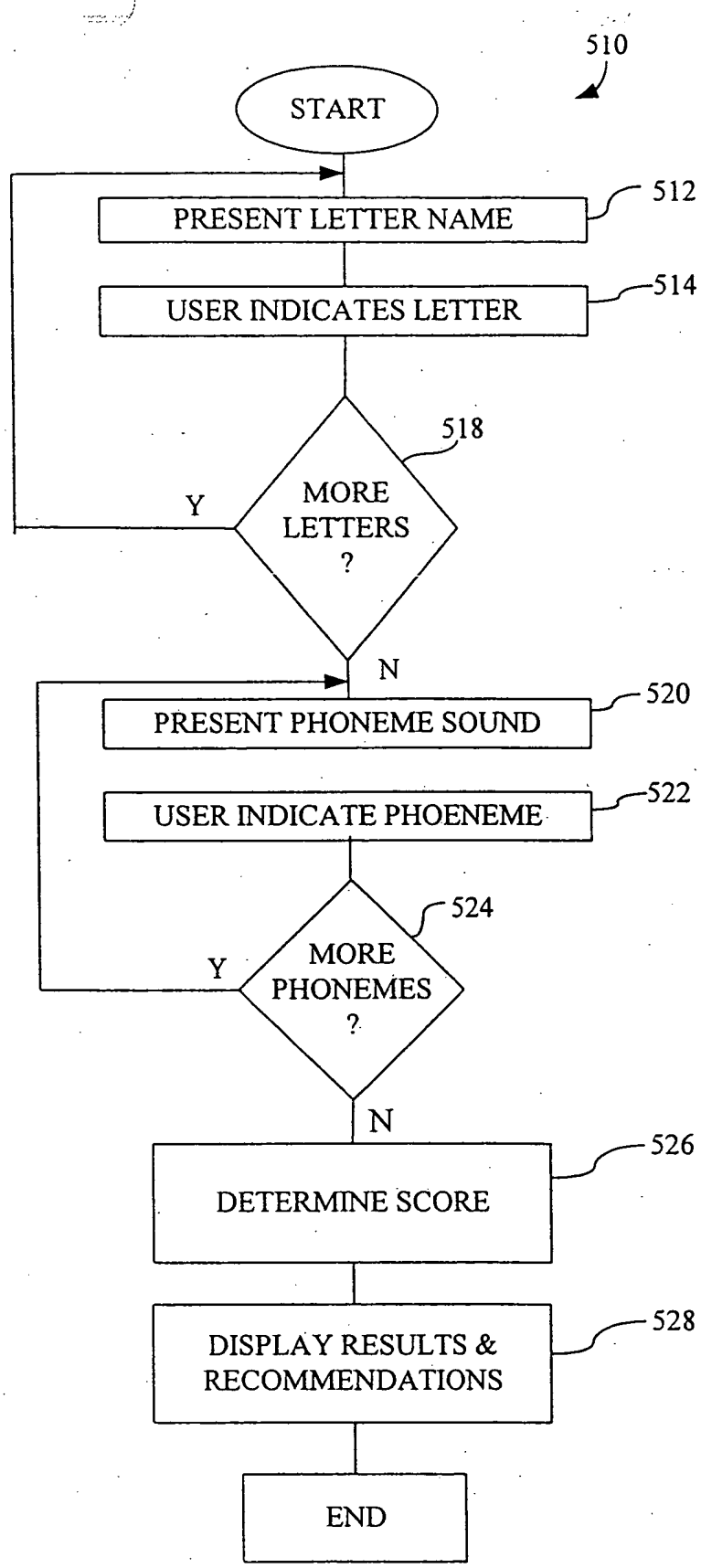

510
START
PRESENT LETTER NAME
512
USER INDICATES LETTER
514
518
MORE LETTERS ?
Y
N
PRESENT PHONEME SOUND
520
USER INDICATE PHOENEME
522
524
MORE PHONEMES ?
Y
N
DETERMINE SCORE
526
DISPLAY RESULTS & RECOMMENDATIONS
528
END

Figure 21

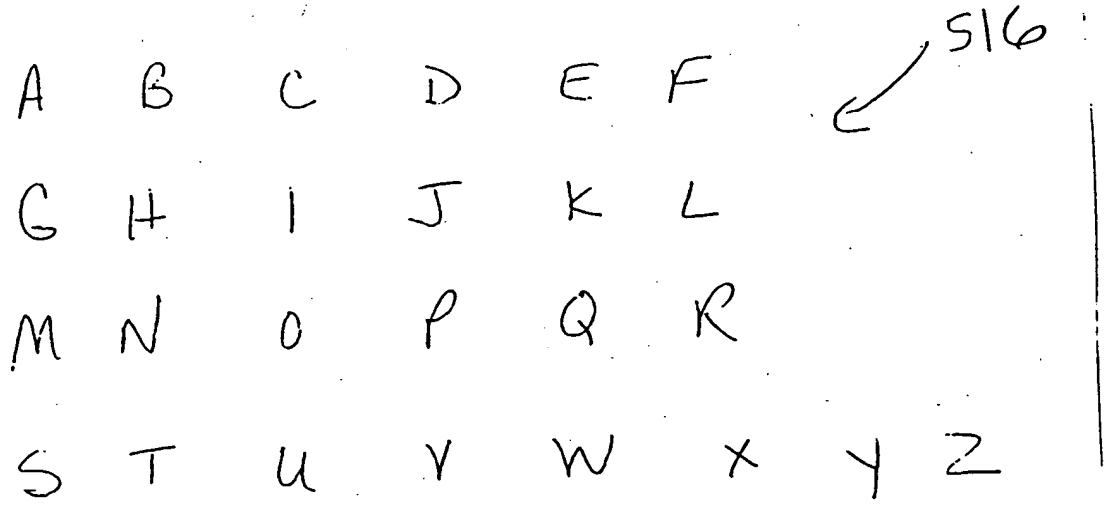


Figure 22

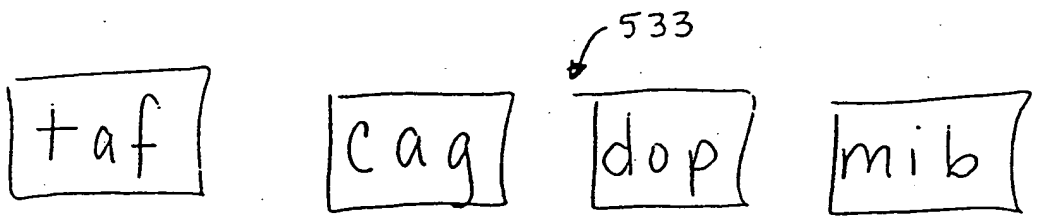


Figure 24

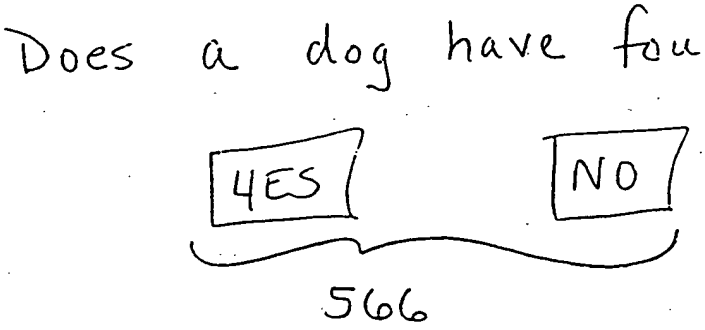


Figure 26

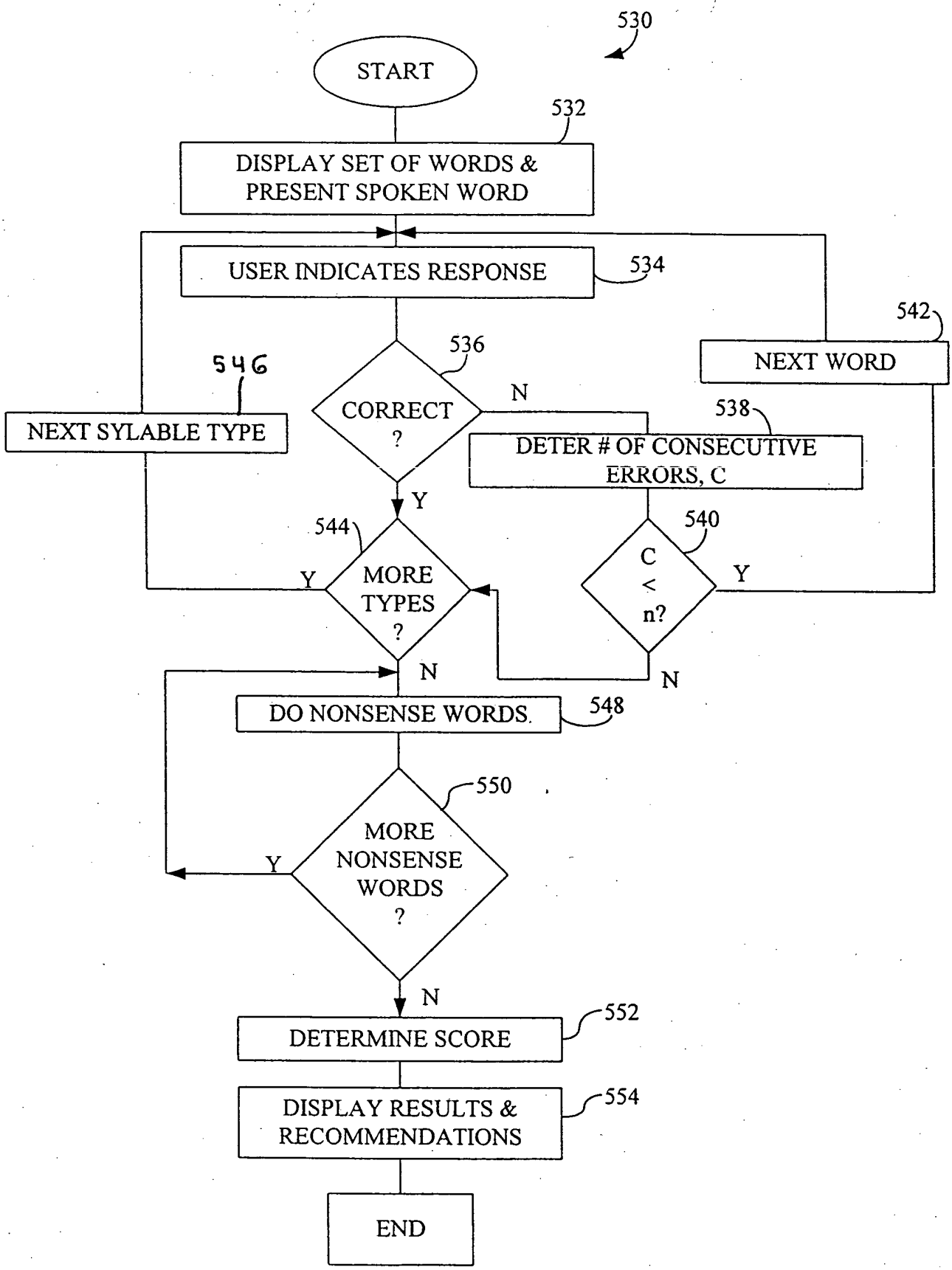

530
START
532
DISPLAY SET OF WORDS & PRESENT SPOKEN WORD
USER INDICATES RESPONSE
534
542
NEXT WORD
536
546
CORRECT ?
N
538
NEXT SYLABLE TYPE
DETER # OF CONSECUTIVE ERRORS, C
Y
544
540
C < n?
Y
MORE TYPES ?
Y
N
N
DO NONSENSE WORDS.
548
550
MORE NONSENSE WORDS ?
Y
N
552
DETERMINE SCORE
554
DISPLAY RESULTS & RECOMMENDATIONS
END

Figure 23

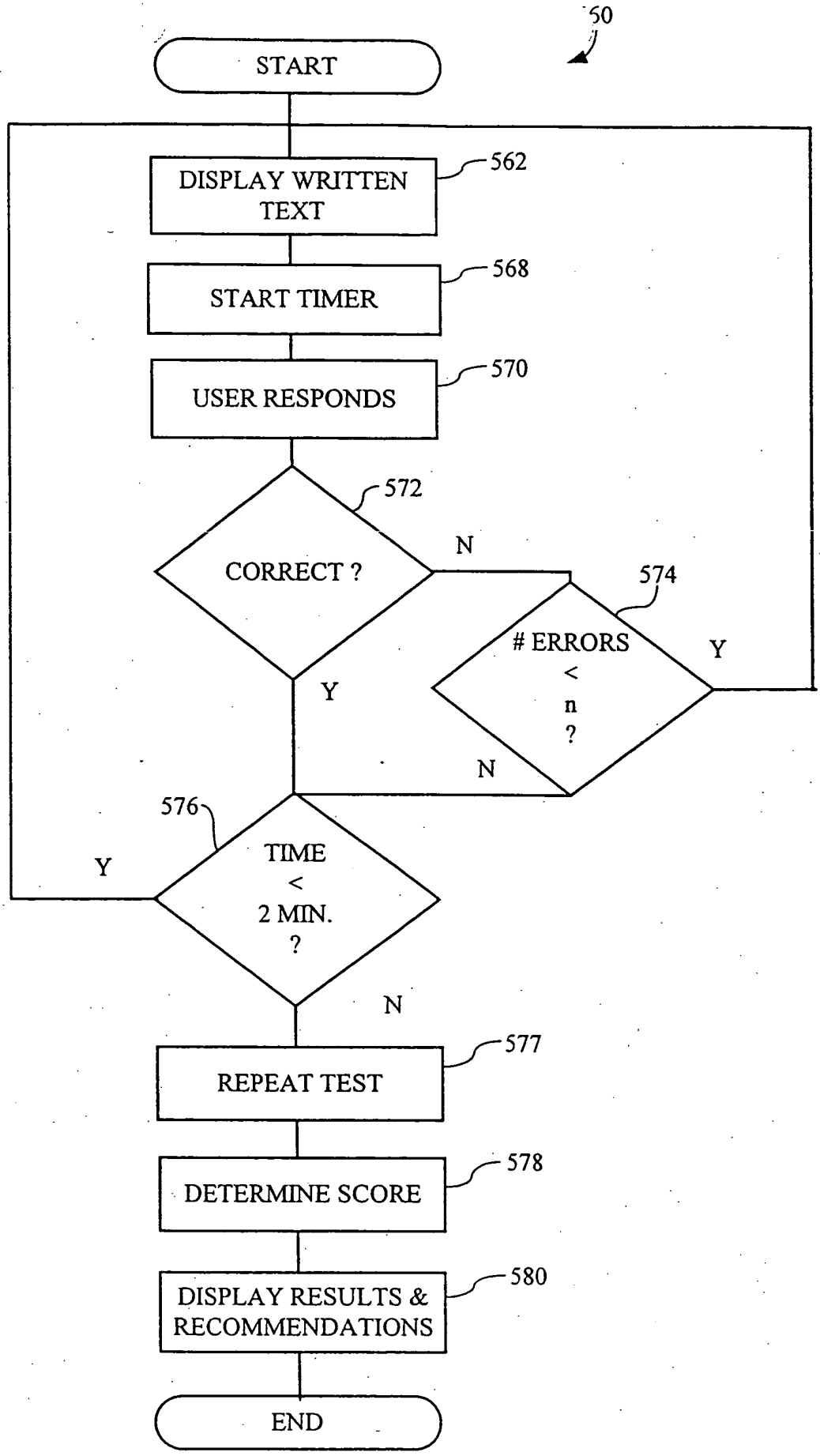

50
START
DISPLAY WRITTEN TEXT
562
START TIMER
568
USER RESPONDS
570
CORRECT ?
572
N
Y
ERRORS < n ?
574
Y
N
TIME < 2 MIN. ?
576
Y
N
REPEAT TEST
577
DETERMINE SCORE
578
DISPLAY RESULTS & RECOMMENDATIONS
580
END

Figure 25

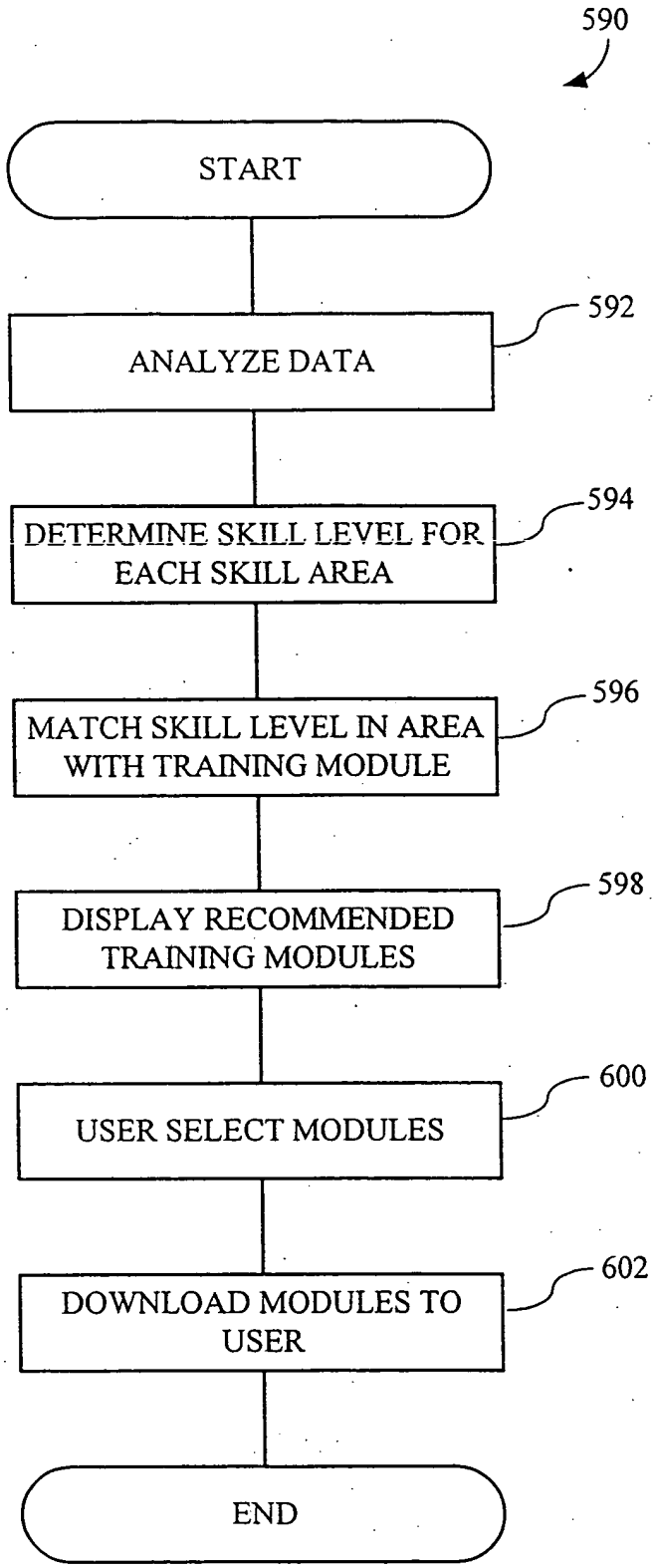

590
START
ANALYZE DATA
592
DETERMINE SKILL LEVEL FOR EACH SKILL AREA
594
MATCH SKILL LEVEL IN AREA WITH TRAINING MODULE
596
DISPLAY RECOMMENDED TRAINING MODULES
598
USER SELECT MODULES
600
DOWNLOAD MODULES TO USER
602
END

Figure 27

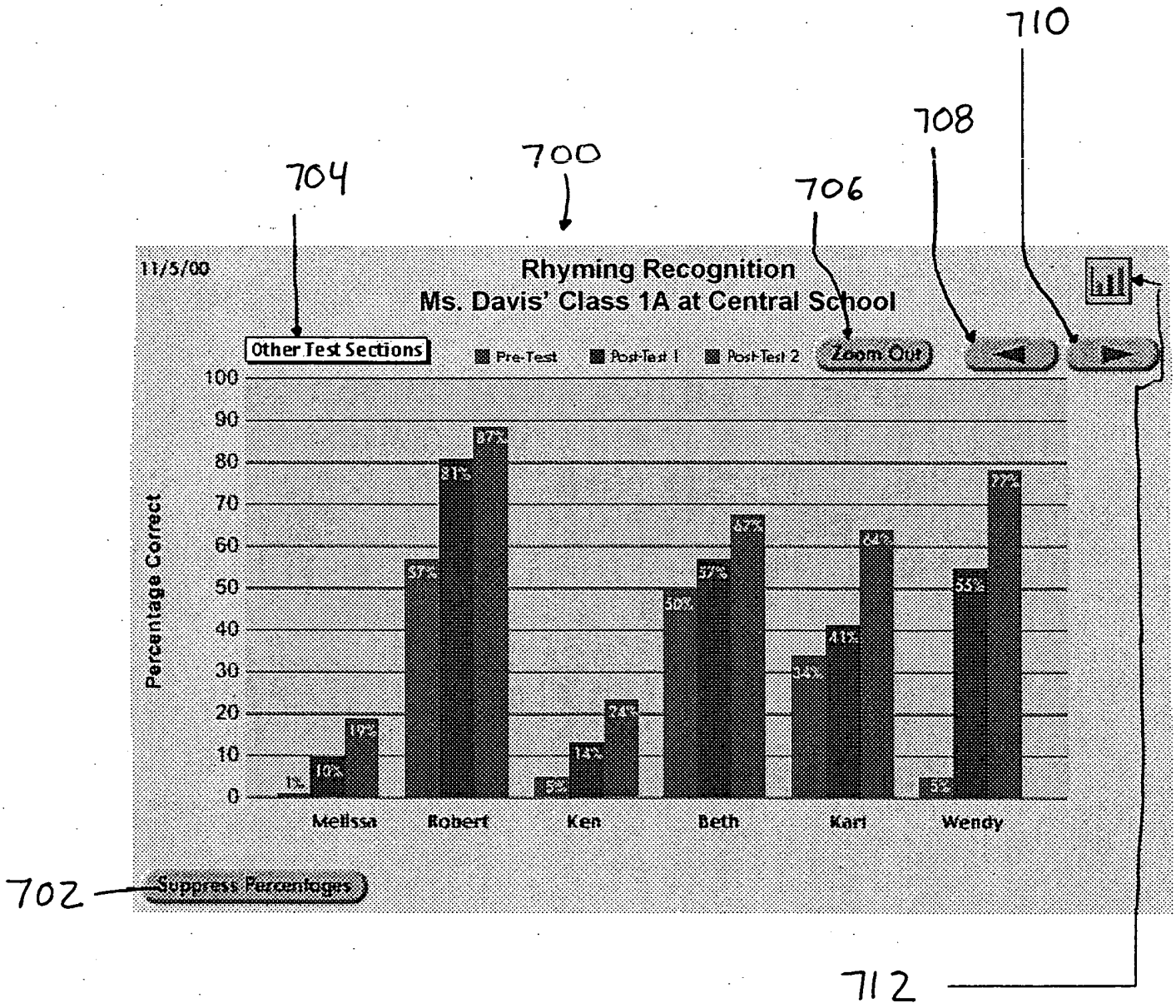

710
708
704
700
706
11/5/00
Rhyming Recognition
Ms. Davis' Class 1A at Central School
Other Test Sections
Pre-Test
Post-Test 1
Post-Test 2
Zoom Out
Percentage Correct
100
90
80
70
60
50
40
30
20
10
0
1%
10%
19%
57%
81%
87%
5%
13%
24%
50%
57%
67%
34%
41%
64%
55%
77%
Melissa
Robert
Ken
Beth
Kari
Wendy
Suppress Percentages
702
712

Figure 28

Rhyme Recognition
Rhyme Generation
Beginning and Ending Sounds
Blending
Segmenting
Manipulating
Recalling in Sequential Order
Rapid Naming
Letter Names and Sound
Decoding
Fluent Reading

740

Figure 29

750

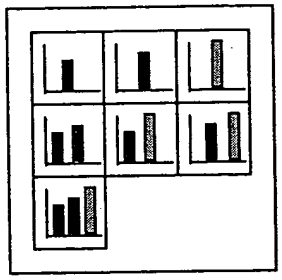


Figure 30